STATE OF ARIZONA

RECYCLING PROGRAM ANNUAL REPORT

Prepared by the
Arizona Department of Environmental Quality
Recycling Program

Report for Fiscal Year 1999
July 1, 1998 - June 30, 1999
Submitted December 1, 1999

STATE OF ARIZONA

RECYCLING PROGRAM ANNUAL REPORT

Recycle Arizona

Prepared by the
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EQR-99-05

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Printed on Recycled Paper

A C K N O W L E D G M E N T S

The 1990 Arizona Solid Waste Recycling Act, through A.R.S. §49-837.D., established a committee to advise the director of the Arizona Department of Environmental Quality (ADEQ) on the use of monies in the recycling fund. The nine members of this committee are appointed by the director[1]. The Arizona Recycling Advisory Committee consists of two representatives from private solid waste haulers, two representatives from private solid waste recycling businesses, four representatives from political subdivisions that have implemented recycling and source reduction programs, at least one of whom resides in a county having a population of fewer than five hundred thousand persons, and one representative of the general public.

We would like to acknowledge the support, commitment and hard work of the following Arizona Recycling Advisory Committee members, who have provided invaluable direction to the director and the Arizona Recycling Program staff.

THE FISCAL YEAR 1999 ARIZONA RECYCLING ADVISORY COMMITTEE

Mr. Joseph Klimoski
1999 Chairperson
President/Owner
Industrial Refuse Service Inc.
Phoenix, AZ

Mr. Mark Wingfield
1999 Vice Chairperson
Plant Manager
Poly Tek Southwest
Queen Creek, AZ

Mr. Neil A. Markowitz
1998 Chairperson
Executive Director
Environmental Education Exchange
Tucson, AZ

Mr. Brian Conway
General Manager
River Cities Waste Service
Lake Havasu City, AZ

Ms. Mary Dahl
Community Development Director
La Paz County
Parker, AZ

Ms. Kay Dyson
Parks & Recreation Director
Town of Eager
Eagar, AZ

Mr. Michael W. Hoyt
Field Operations Director
City of Glendale
Glendale, AZ

[1]The Arizona Recycling Program currently has two positions vacant.

THE ARIZONA RECYCLING PROGRAM

The 1990 Arizona Solid Waste Recycling Act established the Arizona Recycling Program (the Program) within ADEQ. The Program is funded by landfill disposal fees. Outlined in A.R.S.§49-837, Program responsibilities include distribution and administration of funding for the Grant programs which include the Waste Reduction Assistance (WRA) and the Waste Reduction Initiative Through Education (WRITE) Grants. In addition, the Program conducts public education, technical assistance and outreach events. The Program also partners with the Arizona Department of Commerce to attract recycling-related companies to the state, keeping the economic benefits of recycling in Arizona rather than shipping the commodities and losing the benefits to other areas of the world.

The Program staff assist Arizona governmental jurisdictions, for profit and non-profit organizations. The Program team members consist of nine uniquely qualified individuals from ADEQ and a representative from Arizona Department of Commerce.

Tammy Shreeve is the manager of the Recycling Program and Database Management Unit and is responsible for the administrative functions of the Program. Tammy can be contacted by E-mail at shreeve.tam@ev.state.az.us or at (602) 207-4171.

Pat Fizer is the Program's Administrative Assistant and can be contacted for general recycling information by E-mail at fizer.patricia@ev.state.az.us or at (602) 207-4133.

David Janke is the recycling database coordinator. He oversees the collection and compilation of statistical data pertaining to solid waste recycling and disposal. David also conducts research to determine recycling trends and the status of past recycling grant projects. He can be contacted by E-mail at janke.david@ev.state.az.us or at (602) 207-4173.

Jackie Hosier is the recycling information coordinator. She oversees promotional projects, such as the Program's quarterly newsletter, brochures and other informational materials. Jackie also administers the Program's statewide recycling awareness campaigns. She can be contacted by E-mail at hosier.jackie@ev.state.az.us or at (602) 207-4134.

Cara DelVecchio is the recycling education project coordinator. Cara oversees the Waste Reduction Initiative Through Education Grant program and recycling education projects. Cara can be contacted by E-mail at delvecchio.cara@ev.state.az.us or at (602) 207-4865.

Travis Saladino is the recycling program specialist. Travis is a member of the Program's statistical analysis team. He also coordinates the composting and construction and demolition debris programs. Travis can be contacted by E-mail at saladino.travis@ev.state.az.us or at (602) 207-4174.

Cathy Charney oversees the Waste Reduction Assistance Grant program. She can be contacted by E-mail at charney.cathy@ev.state.az.us or at (602) 207-4170.

Tonya Rushlow is the data management specialist and is responsible for maintaining all recycling databases. She is also responsible for the Solid Waste Tracking System (SWATS) database. Tonya can be contacted by E-mail at rushlow.tonya@ev.state.az.us or at (602) 207-4667.

Julie Cabrera is state service intern. She is responsible for updating the Arizona Environmental/ Recycling Hotline. Her E-mail address is cabrera.julie@ev.state.az.us or at (602) 207-4611.

Sandra Watson is the recycling market development manager at the Arizona Department of Commerce. Sandra is responsible for the administrative duties of the Program. Sandra can be contacted by E-mail at sandraw@azcommerce.com or at 1-800-528-8421.

The Arizona Recycling Program staff can also be reached toll-free in Arizona at 1-800-234-5677. The last four digits of the phone numbers listed for a specific staff member should be used as the extension. The ADEQ Website can be accessed at www.adeq.state.az.us.

I. Executive Summary

The Arizona Recycling Program, for the purposes of this report, means the Program, adopted by this State and approved by the Arizona Department of Environmental Quality (ADEQ) to implement Arizona Revised Statute §49-831. The Arizona Solid Waste Recycling Statute became effective in September, 1990. The Statute created a multi-faceted solid waste reduction program that requires specific types of information and recommendations to be included in the Arizona Recycling Program's annual report. The topics discussed in the annual report are: 1) waste stream components analysis, 2) recycling volumes and programs, 3) costs and revenues, 4) recycling grants, 5) public education, 6) recycling market development, 7) used motor oil and 8) recycling opportunities, impediments and disincentives. This report covers the state Fiscal Year July 1, 1998 to June 30, 1999.

The information in this report concerning the public sector's recycling efforts was gathered through the Annual Recycling and Waste Reduction Questionnaire which is distributed to all jurisdictions within the state. A private sector survey, conducted in cooperation with the Arizona Department of Commerce's Recycling Market Development Program, was distributed to all known private recycling companies, non-profit organizations and landfills. As of the publication date of this report, data from the private sector had not been fully received and compiled. It is anticipated that the private sector information will be completed by January 2000. The Program's Web site at www.adeq.state.az.us/waste/solid/recycle.htm should be checked for report updates.

The following is a summary of the FY 1999 highlights:

- The total volume of material reported recycled or diverted from the landfills is 5,031,545 cubic yards. This represents an increase of 41.4 percent over FY 1998. These are preliminary and conservative figures and continuous updates will be supplied on ADEQ's Web site,

- The diversion rate for Arizona, based on volume, is 30.3 percent. This also is a preliminary figure and will be updated on the Web site,

- The recycling rate for Arizona, based on volume, is 23.2 percent. This also is a preliminary figure and will be updated on the Web site,

- Since the Arizona Recycling Program's inception in 1990, it has provided over $6.1 million in grant funding. Sixty-two grants were awarded to public jurisdictions, 51 grants to private sector businesses/organizations, 46 grants to non-profit organizations and 10 grants to universities and colleges, totaling 169 different recycling related projects,

- the Arizona Recycling Program focuses on public education for the ultimate goal of influencing human behavior to properly reduce and dispose of solid waste, and to

encourage the participation of source reduction, reuse and recycling. Although the basic structure of recycling education is often centered around the hierarchy of reducing, reusing and recycling (the 3Rs) solid waste, the program also identifies waste reduction techniques to clarify the 3Rs, and

- Program staff provided advice and technical assistance to jurisdictions, businesses and the public through the distribution of literature, "how-to" guides, and case studies of specific recycling and source reduction programs. Consultation was provided through formal and informal presentations.

II. Waste Stream Components Analysis

The Arizona Solid Waste Recycling Act (A.R.S. §49-832.C.3.) requires this annual report to include an analysis of the various components of the waste stream and to propose changes that will conserve energy and reduce solid waste generation. Studies have been completed that analyze specific Arizona municipal and regional waste streams.[1] Though each study provides a clear indication of the waste stream components within its specific governmental jurisdiction, the studies also indicate that each jurisdiction has a unique waste stream. The differences between waste streams and the span of years in which the studies took place make it difficult to extrapolate these studies to a statewide level. In addition, the studies do not provide information needed to evaluate the waste streams collected by private sector haulers. However, the Arizona Department of Environmental Quality (ADEQ) awarded a Waste Reduction Assistance Research and Development Grant (see Chapter VI of this volume) to the Southwest Public Recycling Association (SPRA) to compile waste stream analysis data for representative rural communities across the state. SPRA has subcontracted the work to the Garbology Project at the University of Arizona. Once the grant project is completed in June 2000, the data obtained can be combined with the aforementioned completed waste stream analysis studies to produce a complete and fairly accurate picture of waste streams in Arizona, both locally and for the state as a whole.

ADEQ does have data available concerning the total amount of solid waste disposed in landfills. [2] The information is derived through tipping fee surcharge payments. These data, along with information provided by local governmental jurisdictions within Arizona and national studies of waste composition, are used as the basis for the development of general waste management strategies.

A. Characteristics of the National Waste Stream

Results of studies analyzing the characteristics of the municipal solid waste stream for the United States are provided by the U.S. Environmental Protection Agency (EPA).[3] This information is valid for the 1997 calendar year. A breakdown of the national municipal solid waste stream is illustrated in Figure 2.1. A total of 217 million tons of municipal solid waste were generated in 1997. This is an increase of eight million tons from 1996, making 1997 the first year with an

Figure 2.1 The components of the municipal solid waste stream for the United States for the 1997 calendar year. The total weight of the national municipal solid waste stream during that year was 217,000,000 tons.

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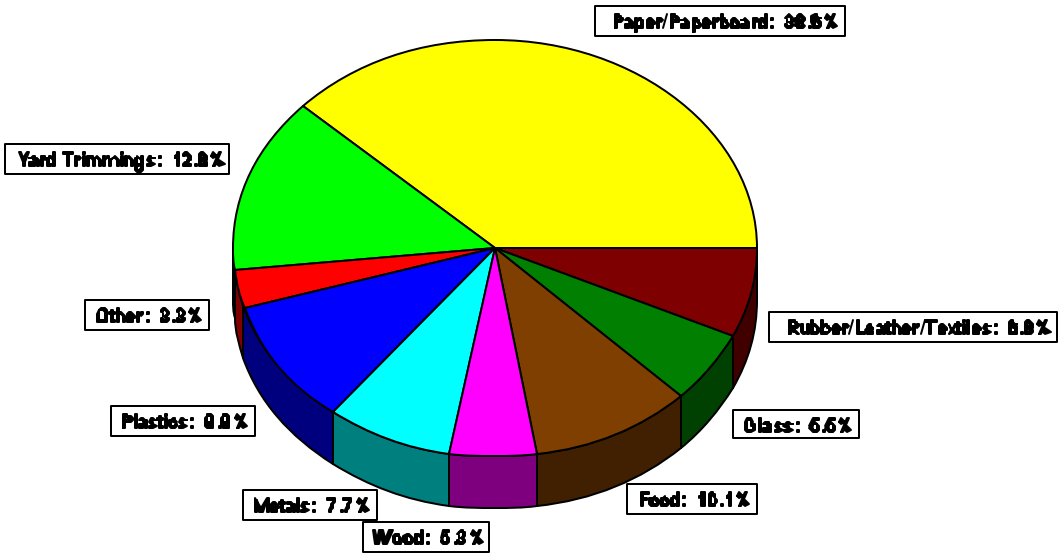
[1]For a list of the waste stream studies available from ADEQ see Appendix A.

[2]For a list of active landfills and the tonnage of waste accepted at each see Appendix B.

[3]Characterization of Municipal Solid Waste in the United States: 1998 Update; EPA530-(in print), U.S. Environmental Protection Agency, July 1999. It may be downloaded from the Internet at www.epa.gov/epaoswer/non-hw/muncpl/msw98.htm



increase after two consecutive years of decreases. The amount of waste generated per person per day increased back to 4.4 pounds after one year at 4.3 pounds in 1996.

B. Defining the Total Solid Waste Stream

For the purpose of defining recycling rates and diversion rates for Arizona and local jurisdictions, the total solid waste stream is composed of the municipal and non-municipal solid waste streams.

The EPA defines municipal solid waste (MSW) as wastes such as durable goods, non-durable goods, containers and packaging, food scraps, yard trimmings, and miscellaneous inorganic wastes from residential, commercial, institutional and industrial solid waste sources.[1] Examples of wastes from these categories include appliances, automobile tires, newspaper, clothing, boxes, disposable tableware, office and classroom paper, wood pallets and cafeteria waste. Public concern relating to solid waste management tends to focus on this portion of the solid waste stream as it is the only portion that can be influenced directly from the home, business or office. Recycling rates are based solely on materials recycled from MSW. These are considered non-municipal solid waste and constitute a significant portion of the waste stream. Examples of non-municipal solid waste include construction and demolition debris, automobile bodies, municipal sludge, combustion ash and industrial process wastes that might be disposed of in municipal solid waste landfills. This report will attempt to separate information concerning MSW from the remainder of the waste stream whenever possible. This will

[1] Ibid.

allow the determination of a recycling rate based solely on the amount of MSW recycled. It will also allow the determination of a diversion rate based on the entire waste stream and the total amount of all waste recycled.

C. Solid Waste Reduction and Energy Conservation

The efforts that the Department recommends to enhance source reduction and energy conservation are the same as last year: buying recycled content products and encouraging backyard composting.
Buying recycled content products creates a demand for materials collected in recycling programs. This not only reduces the amount of waste landfilled, but also significantly reduces the energy needed to produce the new products. Paper is a good example. According to Figure 2.1, paper products comprise approximately 38.6 percent of the national waste stream. Recycled content paper is readily available and performs as well as virgin paper products in computer printers, copying machines and printing presses. Buying paper made with recycled content stimulates markets producing these products. This stimulation is transmitted back through the recycling loop, increasing production of recycled content paper which increases the collection of waste papers for recycling. This is a closed loop in Arizona for old newspaper, that is used as a feedstock at the Abitibi Consolidated paper mill in Snowflake to produce newsprint. Likewise, industrial paper waste is used by Wisconsin Tissue in Flagstaff to produce recycled content tissue products.

In addition, the energy savings inherent in this process are significant. The amount of energy saved by recycling waste paper is equivalent to 4,100 kilowatts per ton.[1] This type of savings occurs for almost every material. Producing aluminum from used beverage containers (UBCs) saves 95 percent of the energy that using bauxite ore would consume. Producing a glass container from recycled glass (cullet) saves enough energy to light a 100 watt light bulb for four hours.

To encourage the buying recycled habit, the Arizona Recycling Program promotes buying recycled products.[2] ADEQ and the Arizona Department of Commerce (ADOC) sponsored the *Third Annual Arizona Buy Recycled Expo* on November 19, 1998. The expo was produced by the Arizona Recycling Coalition and the Southwest Public Recycling Association.[3] Buying recycled content products will be a major focus of recycling conferences sponsored by ADEQ and ADOC to be held during the next fiscal year, including the *Arizona Recycling Coalition First Annual Conference*[1] and the *Southwest Public Recycling Association's Southwest Recycling Market Development Conference.*[2]

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[1]Environmental Evaluator; Wisconsin Tissue; Menosha, WI, 1991.

[2]See Section VI.D. for a discussion of these promotions.

[3]For a description of this project see Section VI.B of this report.

[1]For a description of this conference see Section V of this report.

[2]For a description of this project see Section VII of this report.

Backyard composting is a direct way individual residents can practice source reduction. Second only to paper, yard trimmings represent one of the largest categories of the municipal solid waste stream (12.8 percent). Therefore, backyard composting programs have the potential to significantly reduce the waste stream. In addition, by reducing waste at its source, the energy used to transport and process and/or dispose of the material is saved. Because of their decentralized nature, backyard composting programs are extremely hard to track. Therefore, any waste reduction and energy savings produced by the programs have not been quantified.

There are many backyard composting programs sponsored by individual jurisdictions within the state. During the FY 1998, ADEQ sponsored a backyard composting program operated by the city of Yuma with funding from the 1997 Waste Reduction Assistance Grant program.[1]

D. Legislative Mandates for Waste Reduction

The intent of the Arizona State Legislature in passing the Recycling Act in 1990 was to give Arizona residents the opportunity to recycle. Many local governmental jurisdictions provide a variety of recycling opportunities. During the fall of 1997, discussions were held with recycling and waste disposal stakeholders pertaining to setting a non-mandated state recycling goal. However, feedback from these discussions indicated that a recycling goal was not a priority.

Since Arizona has low landfill disposal fees, as compared to other states, and still has potential land for future landfills, recycling costs in many areas are greater than the cost to dispose of materials. State demographics indicate that many jurisdictions with sparse populations, or those located great distances from recycling markets, have difficulty initiating and maintaining successful recycling programs.[2] To assist small communities, the Arizona Recycling Program targets residents of small communities and encourages them to recycle. Educational materials, technical assistance, grants and seminars are provided to help find alternatives that will reduce the solid waste streams entering their landfills for disposal. In addition, a special Waste Reduction Assistance Grant offered in 1997 was restricted to jurisdictions with populations under 100,000.[1] The purpose of this grant was to address the special challenges that small and rural communities face when establishing recycling programs.

Feedback from small community stakeholders suggests that mandating recycling in Arizona at this time could be counterproductive. It would require cities and towns with scant financial resources to initiate recycling programs having capital costs and transportation costs that, alone, make recycling economically burdensome. The voluntary approach has resulted in small communities making

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[1]State of Arizona Recycling Annual Report: Arizona Department of Environmental Quality, 1997, Section V.B, page 72.

[2]State of Arizona Recycling Annual Report; Arizona Department of Environmental Quality, 1995, pages 40-44.

[1]For an assessment of the projects awarded by this grant see State of Arizona Recycling Annual Report: Arizona Department of Environmental Quality, 1997, Section V.B, pages 66-72.

incremental strides, within their means, to create or expand sustainable recycling programs. The Arizona Recycling Program has been instrumental in assisting such small community programs.

E. Types of Solid Waste Disposed

The Arizona Solid Waste Recycling Act of 1990 imposed a 25 cent disposal fee for each ton (six uncompacted cubic yards or three compacted cubic yards) of waste received at the landfills regulated by ADEQ.[1] Information supplied by reports accompanying payments from the landfill operators has made it possible to determine the total amount of waste landfilled in Arizona.

There are other disposal methods. However, these disposal methods represent a small amount of MSW. These methods include exporting the waste across borders, combustion and illegal (wildcat) dumping. Through questionnaires returned to ADEQ by public jurisdictions and surveys returned to the Recycling Market Development Study by private sector recyclers, the approximate amount of MSW recycled has been identified. These figures are discussed in Section III.

A very small amount of MSW from small and remote border communities is exported from Arizona for disposal. This includes the communities of Portal and Paradise, isolated by the Chiriquahua Mountains in eastern Cochise County, that export their waste to New Mexico. Also, waste haulers and the transfer station in Littlefield, that is separated from the rest of the Mohave County waste system by the Grand Canyon and Lake Mead, export their waste to Nevada. The quantity of MSW exported is not known, but based on the size of the communities involved, it is estimated that it represents less than 0.1 percent of the waste generated by the state. Therefore, it will not be considered in the calculations to follow. In addition, all hazardous waste is exported from Arizona. Hazardous waste is not considered part of the municipal solid waste stream, but is included in the total waste stream. There are no MSW combustion facilities in Arizona. Although there are some medical waste incinerators, medical waste represents a very small percentage of the solid waste stream and will not be considered in the calculations at this time. Used oil is burned in certain manufacturing processes, such as the production of asphalt. ADEQ keeps records concerning this

Figure 2.2: The mathematical equations and data required to determine the MSW generation rate for Arizona. Total waste landfilled can be found in Appendix B. Non-MSW landfilled includes material received by construction and demolition landfills and material identified by other landfills as non in-state municipal solid waste. Figures for diverted materials are explained in Section III.

GENERATION RATE

$$\textbf{Generation Rate} = \frac{\textbf{(Total MSW Generated)*(2000 pounds/ton)}}{\textbf{(Population)*(365 days/year)}}$$

Total MSW Generated = Total MSW Landfilled + Total MSW Diverted

[1] Arizona Revised Statutes §49-836. Solid waste landfill disposal fees.

Total MSW Landfilled =	Total Waste Landfilled - Out-of-State Waste Landfilled - In-State Non-MSW Landfilled
Total MSW Diverted =	Total Waste Diverted - Non-MSW Diverted

Total Waste Diverted =	2,079,215 tons
Total Non-MSW Diverted =	1,055,216 tons
Out-of-state Waste Landfilled =	422,395 tons
In-state Non-MSW Landfilled =	1,603,348 tons
Total Waste Landfilled =	6,189,051 tons
Population of Arizona =	4,848,221 persons

activity, and the amount of used oil burned has been be quantified.[1] Wildcat dumping is a serious problem in some rural areas of the state. However, the amount of material disposed of in this manner is, likely, non-significant when compared to the amount of waste disposed of in the proper fashion, and again, will not be considered in calculations.

The amount of material landfilled, combined with the amount of material reported recycled or diverted, supplies a fairly complete picture of the waste generated in Arizona. Once the amount of total waste is determined, it can be used to determine the per capita generation rate of MSW for Arizona. Figure 2.2 contains the equations to determine the generation rate.

A total of 6,189,051 tons of waste was reported landfilled in Arizona during FY 1999. This total is 426,645 tons, or 7.4 percent more than in Fiscal Year 1998.[2]

The numbers in Figure 2.2 represent not only MSW, but all solid waste. It also includes material imported from other states to be landfilled in Arizona. To determine the amount of this waste that was MSW, the Arizona Department of Commerce requested landfills to identify the percentage of intake that was not Arizona in-state MSW. Of the 55 open and active landfills contacted to supply this data, 42 responded. These respondents represent over 97 percent of the waste landfilled in the state. Using the information they provided, the total amount of in-state MSW landfilled in Arizona was 4,163,308 tons. The remaining 3 percent of the waste stream, representing the non-responsive landfills, would not change this number significantly.

To determine the total amount of MSW generated in the state, the amount of MSW diverted from the landfills must also be determined. The amount of waste that was reported as diverted during FY 1999 was 2,079,225 tons. A portion of this, 1,055,216 tons, was non-MSW. Eliminating this from the total diverted leaves 1,024,009 tons of MSW diverted from landfills.

The amount of exported waste must also be accounted for in the calculations. However, close to 100 percent of that waste was non-MSW and, therefore, exported waste is considered insignificant for this determination.

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[1] See Section VIII of this report for a discussion.

[2] A total of 5,762,406 tons were reported landfilled in the State of Arizona Recycling Program 1998 Annual Report.

Combining the amount of In-State MSW with the amount of MSW diverted gives the total amount of MSW generated in Arizona, 5,187,317 tons. This is an increase of 45,108 tons, 0.9 percent more than in FY 1998.[1] Based on a population of 4,848,221[2] for Arizona, the per capita MSW generated in Arizona is 5.86 pounds per person per day. This represents a 3.6 percent reduction from last year[3], and can be attributed to the exceptional response rate by Arizona landfills and the specific information identifying the proportion of in-state MSW they accept. The state's waste generation rate is still 32 percent greater than the national average of 4.44 pounds per person per day.[4] Arizona's higher rate may be the result of a large number of winter residents who are not included in the population figure for the state, and the longer growing season leading to greater amounts of greenwaste.

F. National Market Trends

Recyclable commodity markets are relatively young, that leads to exaggerations in the price fluctuations that all commodity markets experience. Normal price changes occur, year in and year out, due to seasonal activities such as holidays and regularly scheduled manufacturing mill shut downs (down times). However, additional factors influence price. During the FY 1999, the most prevalent of these additional factors included the global conditions pushing many commodity prices to a 12-year low, availability of virgin materials, economic conditions at home, and a severely weak foreign demand.

There are more than 40 recyclable commodity markets. The Arizona Recycling Program focuses on four major types. Analyses and graphs of these four commodities are provided in this section. Each commodity type is broken into various subcategories which experience their own fluctuations. The prices given represent national averages paid by the manufacturing industry as presented in *The Recycling Manager*. They are consistently higher than prices paid by processors to communities and individuals.

1. Paper

The commodity market for recyclable paper fluctuated for most of FY 1999. The paper commodities that are tracked by the Arizona Recycling Program are old corrugated containers (OCC), old newsprint #8 (ONP) and sorted white ledger (SWL). Figure 2.3 illustrates the price fluctuations these three categories.

Due to varied market demand, OCC experienced price fluctuations during the reporting period. In FY

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[1] A total of 5,142,209 tons of MSW was reported generated in the Recycling Program's 1998 annual report.

[2] Arizona Department of Economic Security, Research Administration, Population Statistics Unit.

[3] The reported per capita waste generated from 1998 was 6.08 pounds per person per day.

[4] Characterization of Municipal Solid Waste in the United States: 1998 Update; EPA530-(in print), U.S. Environmental Protection Agency, July 1999. It may be downloaded from the Internet at www.epa.gov/epaoswer/non-hw/muncpl/msw98.htm

1998, the price of OCC peaked at $96.00 per ton but steadily declined to close out at $58.00 per ton.[1] For the first half of FY 1999, the price for OCC continued to decline, dropping to a two year low of $33 per ton on December 14, 1998.[2] Industry representatives believed the extreme price drop was due to downtime at the mills and the overseas market flooding more-than-ample inventories.[3] A combination of hard winter weather and a greater offshore demand helped increase the price to close the FY 1999 at $66.00 per ton.[1]

Old newspaper can be divided into several different grades. Newsprint #8 is a higher quality grade used by newsprint and cellulose insulation manufacturers in Arizona and is the grade tracked by the Arizona Recycling Program. In FY 1998, the price for old newsprint experienced a steady increase and closed at $35.00 per ton.[2] Then for a second year, the market for ONP #8 continued to grow. In December 1998, downtime at the mills and overstuffed issues produced a $2 per ton drop.[3] Prices regained their momentum in January 1999, and continued to increase for the remainder of the year. Processors believe slimmer newspaper issues and diminishing inventories, increased the market for ONP to $50 per ton on June 28, 1999.[4]

The markets for this paper grade is growing in Arizona. The state is home to three large end markets for ONP, including Abitibi Consolidated in Snowflake, Greenstone Industries and U.S. Fiber, both located in Phoenix. Having these end markets in the state helps boost the collection of ONP and decreases the cost of transportation to the processors of this material.

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[1]Recycling Manager; Cahners Business Information, New York, NY, Vol. 8, no. 13, p. 1, 1998.

[2]Recycling Manager; Cahners Business Information, New York, NY, Vol. 8, no. 25, p. 1, 1998.

[3]Recycling Manager; Cahners Business Information, New York, NY, Vol. 8, no. 25, p. 1, 1998.

[1]Recycling Manager; Cahners Business Information, New York, NY, Vol. 9, no. 13, p. 1, 1999.

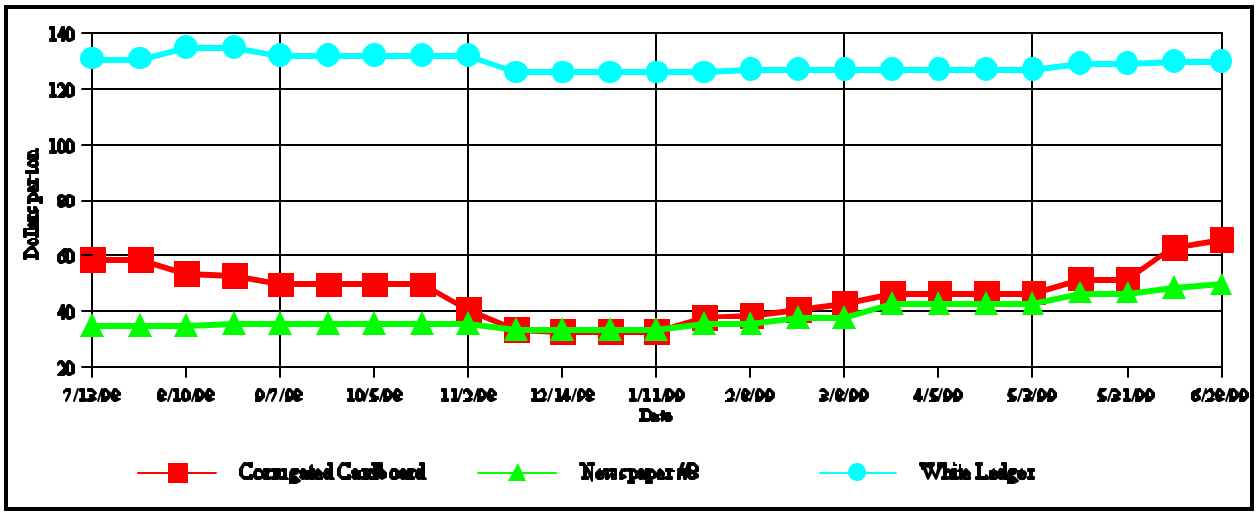
[2]Recycling Manager; Cahners Business Information, New York, NY, Vol. 8, no. 13, p. 1, 1998.

[3]Recycling Manager; Cahners Business Information, New York, NY, Vol. 8, no. 25, p. 1, 1998.

[4]Recycling Manager; Cahners Business Information, New York, NY, Vol. 9, no. 13, p. 1, 1999.

The final paper commodity tracked by the Arizona Recycling Program is sorted white ledger. For most of FY 1998, the market for SWL remained stable at $135 per ton. For the first half of FY 1999, the price fluctuated between $130 and $135 per ton. In November 1998, expected downtime at the mills dropped the price to $126 per ton.[1] The market remained at $126 for the next several

Figure 2.3 Recyclable paper prices for FY 1999. Paper grades include corrugated cardboard, newspaper and white ledger. Prices are taken from the *Recycling Manager*, 1998, Volume 8, numbers 14 - 26, and 1999, Volume 9, numbers 1 - 13. Figures are national averages reported bi-weekly in dollars per ton.



months, rebounding slightly to close the year at $130.00 per ton.[2]

2. Plastics

The plastics that are tracked by the Arizona Recycling Program are High Density Polyethylene (HDPE), natural and mixed color, and Polyethylene (PET), clear and mixed color. Figure 2.4 illustrates the commodity market for recyclable plastics.

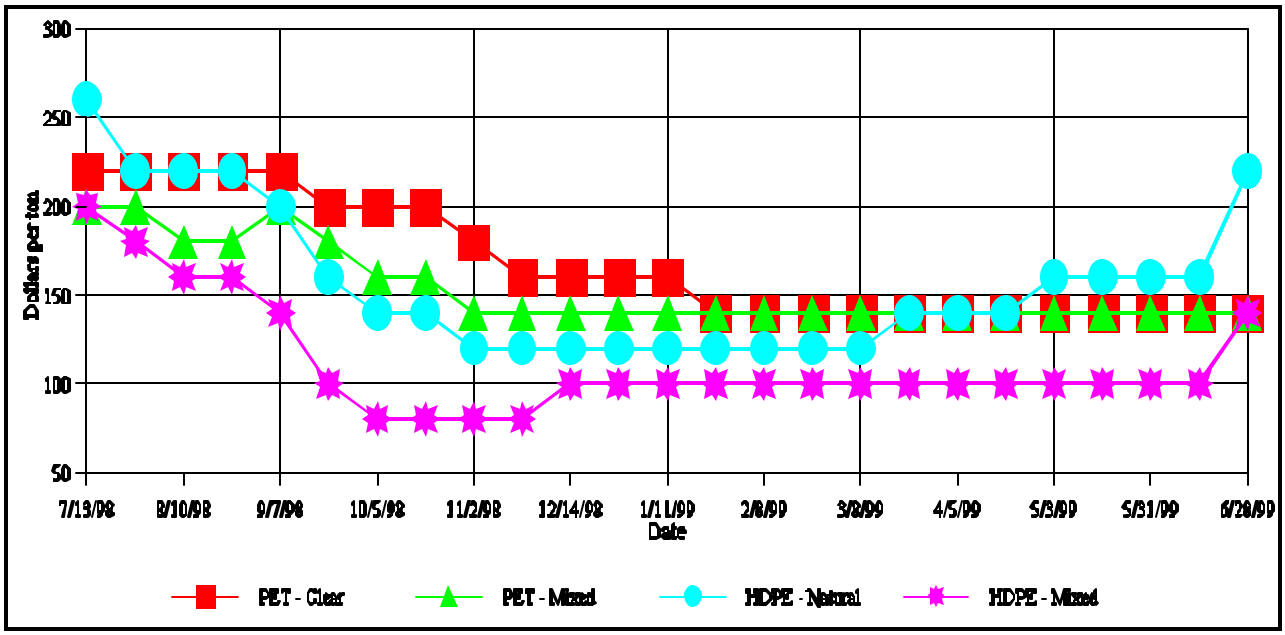
As reported in past years, the prices for recyclable plastic commodities fluctuated greatly over FY 1999. The first half of FY 1999 witnessed a sharp decline in the prices of high-density polyethylene (HDPE) and polyethylene Terephthalate (PET) bottles. This trend, that began early in the year, was due to an oversupply of virgin resins and the continuing decline in monomer prices, due to a worldwide crude oil glut. This resulted in scrap plastic processors selling into a market where resin prices were moving downward, even though demand for plastics was strong. Continued weakness in the export market for recycled plastics further weakened the conditions of a poor domestic market.

[1]Recycling Manager; Cahners Business Information, New York, NY, Vol. 8, no. 24, p. 1, 1998.

[2]Recycling Manager; Cahners Business Information, New York, NY, Vol. 9, no. 13, p. 1, 1999.

In fact, the price for natural HDPE approached a decade-low in the fall of 1998.[3] Commodity scrap resins, including HDPE and PET, had to wait until a rise in oil prices and a strengthening of the Asian plastic market for pricing to increase. During this period, several recycled plastic processors closed their operations, including the Phillips operation in Tulsa, OK, that served as a market for Arizona plastics, and annually consumed six percent of the nation's HDPE.[2] Weakened prices continued until mid to late November 1998, when the market saw a slight improvement due to increases in exports.[3] This improvement was brief though, and prices stayed low until the very end of the year. An increase in virgin resin pricing, stronger export demand and expansion in the production of plastics packaging, caused an increase in HDPE prices throughout the nation. This increase was felt strongly in the western

Figure 2.4 Recyclable plastic prices for FY 1999. Plastic grades include clear PET, mixed PET, natural HDPE, and colored HDPE. Prices are taken from the *Recycling Manager*, 1998, Volume 8, numbers 14 - 26, and 1999, Volume 9, numbers 1 - 13. Figures are national averages reported bi-weekly in dollars per ton.



U.S., that saw some natural HDPE prices reach as high as $300 per ton.[4]

PET prices followed the declines that HDPE had, but to a lesser extent. The increased supply of virgin

[1]Information obtained from the Arizona Department of Commerce.

[2]Waste News, Crain publications, Detroit, MI, Vol. 4, no. 21, p. 26, 1998.

[3]Recycling Manager; Cahners Business Information, New York, NY, Vol. 8, no. 25, p. 1, 1998.

[4]Recycling Manager; Cahners Business Information, New York, NY, Vol. 9, no. 13, p. 1, 1999.

resins due to low oil prices caused a drop in PET prices.[1] As well, a weak export market added to the decline in PET prices throughout the fiscal year.[2] There was speculation by recyclers that the recyclable PET beer bottle of Miller Brewing Company would flood the market and therefore drive the prices down even further.[3] This never materialized as an agent to push prices down. However, PET prices did not recover by the end of the year and remained around $140 per ton.

3. Metals

Unlike the previous year where the recycled metal markets remained fairly stable and experienced only minor fluctuations, prices for the recycled metals commodities declined for most of FY 1999. The Arizona Recycling Program tracks two types of post consumer metal: used beverage cans (aluminum) and used steel cans (steel). Figure 2.5 illustrates the price fluctuations for recyclable metals market.

Aluminum is the most valuable material recycled by American households. For FY 1999, the market for used aluminum beverage cans was challenged by an increased Russian exports, the Asian economic crises and an over abundant supply. The plummet in the value of the Russian ruble in August 1998, pushed aluminum prices down worldwide. In anticipation of yet another increase in low-priced Russian aluminum exports, the Russians scrambled to support the value of their currency. As the world's largest exporter of aluminum, Russia's action resulted in worldwide weaker prices and coincided with a strong decline in metal consumption in Asia.[4] The scrap aluminum market remained weak from January through March 1999, due to high metal inventories. From April through June 1999, pricing improved modestly.

The price for used aluminum beverage cans (UBC) began the fiscal year at $920 per ton, down $260 per ton from the FY 1998.[5] Throughout the FY 1998, the market fluctuated between $920-$940 per ton. On August 24, 1998, the price dropped to $880 per ton, a four-year low.[6] The market recovered slightly to close out FY 1999 at $940 per ton.[7]

The market for used steel cans declined for most of FY 1999. Weakened pricing was initially due to reduced exports to Asia and the General Motors strike. However, the strength of the U.S. dollar caused an influx of low cost scrap imports into the U.S. Finally, domestic steel producers charged that Russian and Asian steel producers dumped finished steel products into the U.S. at below

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[1]Recycling Manager; Cahners Business Information, New York, NY, Vol. 8, no. 25, p. 1, 1998.

[2]Waste News, Crain publications, Detroit, MI, Vol. 4, no. 21, p. 22, 1998.

[3]Recycling Manager; Cahners Business Information, New York, NY, Vol. 9, no. 2, p. 1, 1999.

[4]Information obtained from the Arizona Department of Commerce.

[5]Recycling Manager; Cahners Business Information, New York, NY, Vol. 8, no. 14, p. 1, 1998.

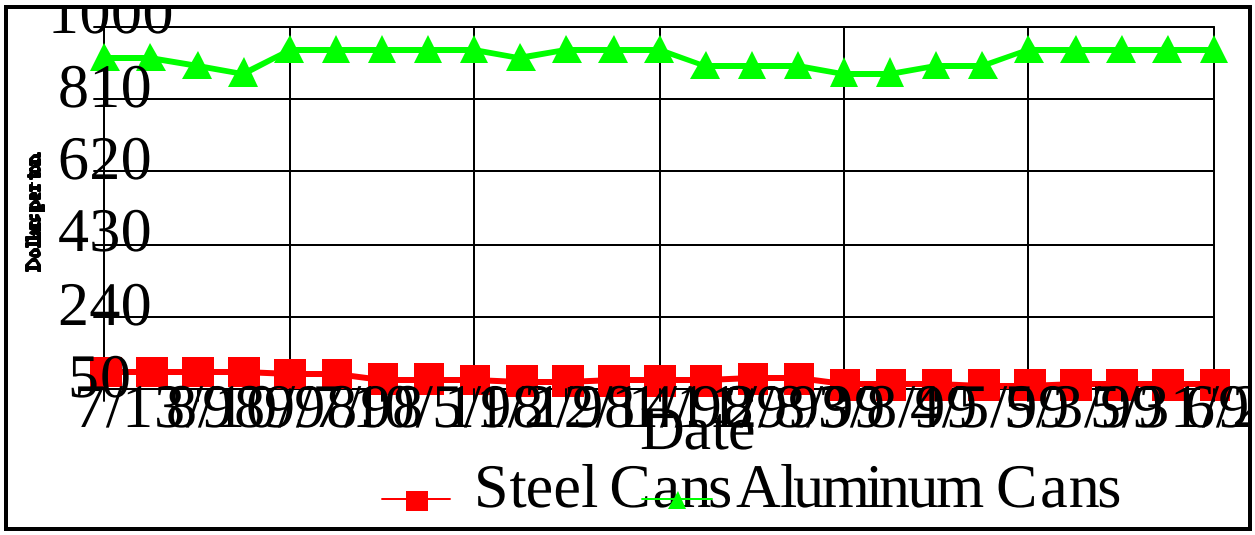
[6]Recycling Manager; Cahners Business Information, New York, NY, Vol. 8, no. 17, p. 1, 1998.

[7]Recycling Manager; Cahners Business Information, New York, NY, Vol. 9, no. 13, p. 1, 1999.

production costs. As a result, the U.S. steel industry slowed and shuttered production, reducing demand and causing prices for scrap steel to fall to near record lows.[1]

The price for used steel cans started out FY 1999 at $98 per ton and remained steady for several months. However, on October 5, 1998, the market dropped to $80 per ton. The market continued to declined, hitting a three-year low of $74 per ton on November 30, 1998. The market began to rebound in February 1999, as the steel imports to the U.S. decreased. However, for calendar year 1998, imports of steel mill products were 30

Figure 2.5 Recyclable metal prices for FY 1999. Metals tracked include steel cans ("tin cans" or "bi-metal cans") and aluminum cans. Prices are taken from the *Recycling Manager*, 1998, Volume 8, numbers 14 - 26, and 1999, Volume 9, numbers 1- 13. Figures are national averages reported bi-weekly in dollars per ton.



percent above the 1997 level. The market for used steel cans closed the 1999 out at $66 per ton, the lowest price since January 2, 1995. This was actually the lowest price in almost 30 years, adjusting for inflation.

With the closure of Proler's Coolidge plant in 1998, markets for steel in Arizona were reduced. However, the Northstar Steel operation in Kingman and Phelps Dodge in Bisbee continue to provide a market for steel cans in the state.

4. Glass

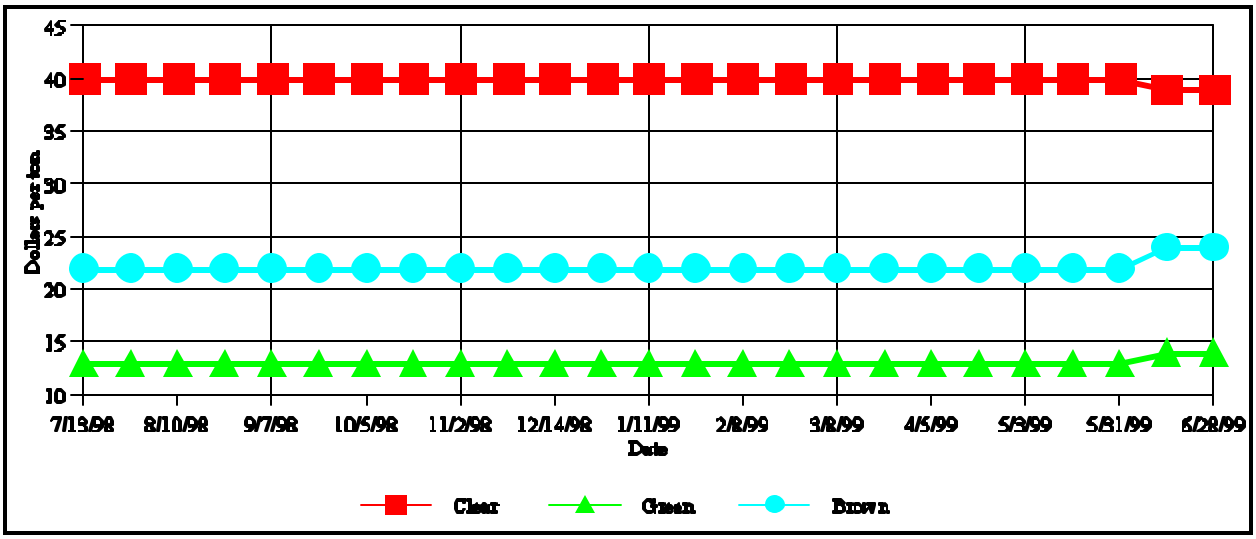
Glass cullet continues to exhibit the most stable pricing of all of the major recyclable commodities. Even though it lost some market share to other commodities such as aluminum and plastic, prices for secondary glass fell only slightly over the past year for green (emerald) and increased slightly for the clear (flint) and brown (amber) (see Figure 2.6). Although the national trends do not reflect it, the prices paid for clear and brown glass dropped almost $7 per ton in the western United States in

[1]Information obtained from the Arizona Department of Commerce.

September 1998, due to an over supply of material.[1]

Arizona recyclers benefit tremendously from the minimum recycled content in glass containers required by the state of California. Since California glass container manufacturers are unable to collect sufficient supplies of glass in their state to meet the minimum content law, demand is strong for Arizona-sourced glass cullet. As a result of this demand, Container Recycling Alliance (CRA) opened a glass processing operation in Phoenix. Additional alternatives for glass have improved the markets in Arizona. Norton Environmental's Material Recycling Facility in Flagstaff has established a glass crushing operation. The material is used locally by the City. EnviroSand, a manufacturer of value-added crushed glass products, provides a second market for glass in the Phoenix metro-area with their operation in Scottsdale.

Figure 2.6 Recyclable glass prices for FY 1999. Glass colors include clear (flint), green (emerald), and brown (amber). Prices are taken from the *Recycling Manager*, 1998, Volume 8, numbers 14 - 26, and 1999, Volume 9, numbers 1 - 13. Figures are national averages reported bi-weekly in dollars per ton.



Western Fiberglass/Owens Corning in Eloy uses glass cullet in the manufacture of fiberglass. Finally, Potters Industries in Kingman has provided a long-term market for plate glass.

As a result of the establishment of Arizona-based recycling markets for glass, that decreases transportation costs, more communities have been able to incorporate glass recycling into their waste reduction and recycling programs.

[1]Waste News, Crain publications, Detroit, MI, Vol. 4, no. 20, p. 34, 1998.

III. Recycling Volumes and Programs

The Arizona Solid Waste Recycling Statute (A.R.S. §49-832.C.2.) requires that the volume of material recycled during the preceding year be reported annually. This section reports these figures for FY 1999. Information reported in this section includes:

- The jurisdictions that responded to the distributed questionnaires,
- The total amount of material reported as recycled and/or diverted from landfills by jurisdictions, and the composition of that material,
- The materials recycled, and/or diverted by each individual jurisdiction,
- The diversion rate for Arizona,
- The recycling rate for Arizona,
- The historical growth of the volumes of materials reported recycled and/or diverted from 1991 through 1999,
- The status of curbside recycling programs within the state, and
- A synopsis of other public and private recycling programs within the state.

The information presented concerning public sector recycling was gathered through the Annual Waste Reduction and Recycling Questionnaire. The Arizona Recycling Program's questionnaire is distributed to all local governmental jurisdictions within the state. The Program also distributes a treecycle survey in January to these same jurisdictions to track the number of Christmas trees recycled. A private sector survey, conducted in cooperation with the Arizona Department of Commerce (ADOC), was distributed to all known private recycling companies, scrap metal dealers, private composters, unincorporated communities, non-profit organizations, manufacturers of recycled content products and active landfills.

The response rate for public jurisdictions increased for FY 1999 and the Arizona Recycling Program appreciates the cooperation of the respondents. The response rate for the private survey increased dramatically this past year. However, at the time of publication of this report, data from all sectors of the recycling community had not been fully compiled as responses are still being received. Therefore, the information presented here is representative of the recycling industry in Arizona, but is not the complete picture. As more information is compiled, the recycling rate, diversion rate and generation rate for Arizona will be revised on the ADEQ's Web site (www.adeq.state.az.us/waste/solid/recycle.htm).

A. Response Statistics

The Arizona Recycling Program distributed its FY 1999 Annual Solid Waste Reduction and Recycling Questionnaire to 102 governmental jurisdictions in Arizona. Eighty-six of the local governments completed and returned the questionnaire. This represents an 84.3 percent response rate. The number of citizens represented by the responding jurisdictions accounts for 99.0 percent of the state's population.

B. Volumes and Composition of Material Diverted in Fiscal Year 1999

Volume information was reported by 57 of the jurisdictions for FY 1999. This is a decrease of seven jurisdictions from last year. The decrease is the result of fewer positive responses to the supplemental treecycle survey conducted in January 1999. In an effort to describe a more complete picture of the status of recycling and waste diversion in Arizona, the Arizona Recycling Program included recycling volume information from additional sources. These sources include the waste tire diversion program, used oil diversion program and bio-solids (waste water treatment sludge) diversion reports.

A summary of the volumes of material diverted from the state's landfills during FY 1999 is given in Table 3.1. These totals are compared to the figures for the FY 1998. Volumes are reported in cubic yards as required by statute. Their equivalents in tons are provided in Table 3.2. Diverted materials have been divided into six major categories: paper, metals, miscellaneous (textiles, rubber, oil, fly ash, household hazardous waste, etc.), organics (green, wood, yard waste, bio-solids, etc.), plastics and glass. Table 3.2 lists the composition of the materials diverted as a percentage of the total for each material category. These proportions are also presented graphically in Figure 3.1.

The metals category represents the largest fraction of materials diverted from landfills in the state. This is the second consecutive year of significant increases, that are the result of improved reporting from private scrap metal dealers. The bulk of the material in this category is ferrous metal scrap. Most of this scrap metal is non-MSW, such as metal salvaged from demolition sites and automobile bodies. At this time, the composition of the scrap metal stream has not been broken down into its component parts. However, the Arizona Recycling Program is researching this in an effort to remove auto bodies from the figure as auto bodies have not traditionally been disposed of in landfills.

The amount of paper recycled and/or diverted in Arizona increased significantly during FY 1999 to become the second largest category of materials recycled. The increase is due to the larger number of responses from the old corrugated container (cardboard) and high grade paper (office paper) sectors of the recycling industry. Though it is believed that the data for paper recycling is the most accurate ever compiled, several large scale paper recyclers have yet to respond to the survey. Therefore, the final figures for paper should show an even higher increase.

Table 3.1: A comparison between FY 1998 and FY 1999 of the amounts of material diverted by type. The table shows quantities in cubic yards along with the percent increase or decrease between the two years. The information given in the table is valid as of **November 4, 1999.**

Material	Amount Diverted (Cubic yards)		Yearly Increase
	1998	1999	(Percent)
Paper	880,446	1,679,036	+ 90.7 %
Metals	700,163	1,851,352	+164.4 %
Miscellaneous	1,050,721	814,844	- 22.4 %
Organics	845,443	597,974	- 29.3%
Plastics	72,641	78,132	+ 7.6 %
Glass	9,447	10,207	+ 8.0 %
TOTAL	**3,558,861**	**5,031,545**	**+41.4** %

Table 3.2: The composition of materials diverted in FY 1999. The quantities are given in cubic yards and tons. The percentage of the total that each material category represents is given for both units of measure to illustrate their differences[1]. The information given in the table is valid as of **November 4, 1999.**

Material	Cubic Yards		Tons	
	Amount	Percentage	Amount	Percentage
Paper	1,679,036	33.4 %	654,132	31.5 %
Metals	1,851,352	36.8 %	511,512	24.6 %
Miscellaneous	814,844	16.2 %	459,176	22.1 %
Organics	597,974	11.9 %	426,247	20.5 %
Plastics	78,132	1.6 %	13,868	0.7 %
Glass	10,207	0.2 %	14,290	0.7 %
Total	**5,031,545**	**100.1 %**	**2,079,225**	**100.1 %**

Miscellaneous materials, the third largest category, decreased significantly. This is the result of no responses indicating the amount of fly ash diverted during FY 1999. The previous year, fly ash represented a large portion of the miscellaneous category. Other significant materials in this category are waste tires and used oil. As Arizona continues to recycle the very large number of waste tires it

[1]Differences between cubic yards and tons are due to the amount of open space left in the landfill by the materials, i.e. aluminum cans are mostly air even after being compressed in a landfill by burial.

produces, the miscellaneous category will continue to account for a large portion of the waste diversion stream. In addition, the amount of household hazardous waste (HHW) diverted from the waste stream, which includes used oil, increased.[1] Jurisdictions are holding more HHW collection events and several communities have opened or are planning permanent HHW collection facilities. Likewise, the amount of HHW collected may be increasing because Arizona residents are becoming more knowledgeable about the proper disposal of HHW through awareness campaigns conducted by organizations such as the Environmental/Recycling Hotline, the Arizona Association of Realtors and ADEQ.

The reported diversion of organics also decreased during the past year. A great portion of this decrease is the result of incomplete reporting of bio-solids diversion. However, this information is required by the U.S. EPA and the data will become available in the future. At that time, it will be used to update this category and it should result in an overall increase. The Waste Reduction Assistance Grant program funded several composting projects.[2] These grants were for either new private composting operations or major expansions. The private composters which received State funding reported diverting over 100,000 more tons of organic material this year than they did the year before.

The volume of plastics reported as recycled and/or diverted has increased over the past year. This was welcomed, as the amount decreased the year before due to changes in reporting methods. The increase is the result of much better reporting from the private plastic recyclers. The Arizona Recycling Program has awarded grant money to the plastic end-user sector of the industry.[3] Hopefully, this funding will be reflected in further increases in the amount of plastic diverted and recycled.

Finally, the amount of glass collected for recycling showed an increase over the past year. Once again, this is probably the result of more complete reporting by the glass recycling industry. In addition, the Market Development Program at ADOC and the Arizona Recycling Program have targeted the glass recycling industry to attract processors and end-users. The new processing capacity that has resulted from this effort may be appearing in the increased amounts of glass reported as recycled.

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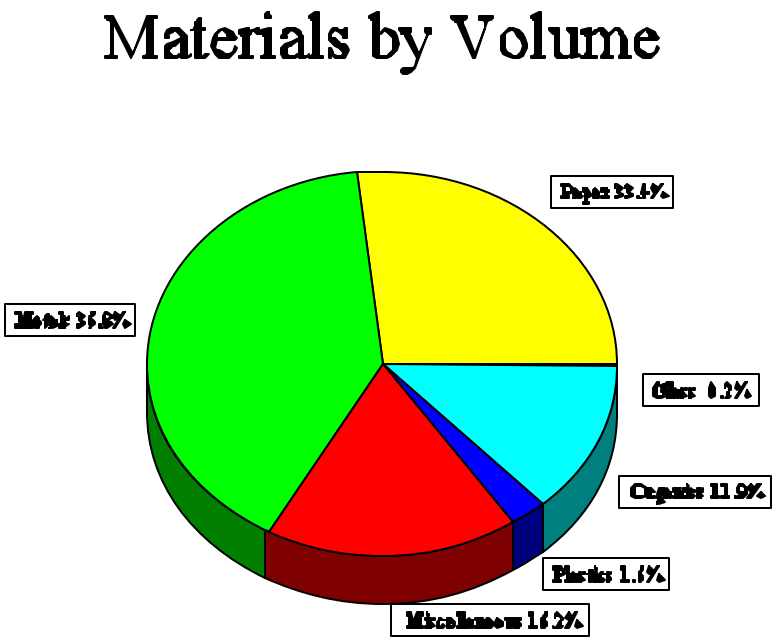
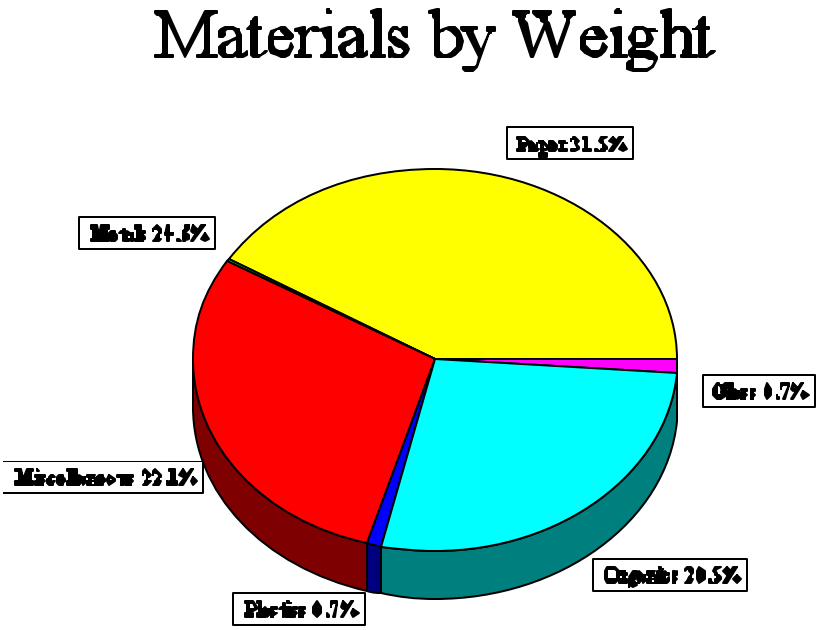
[1]For more detailed information concerning used oil diversion, see Section VIII.B of this report.

[2]For information concerning composting grants, see Section V of this report.

[3]For information concerning recycling grants for the plastic industry, see Section V of this report.

Figure 3.1: A comparison of the volume and weight of materials diverted from Arizona landfills during FY 1999. The upper pie chart shows the breakdown of materials by percentage of volume. The total volume equals 5,031,545 cubic yards. The lower pie chart shows the breakdown of materials by percentage of weight. The total weight equals 2,079,225 tons.





C. Materials Recycled by Jurisdiction

The materials diverted by each jurisdiction during the FY 1999 are listed by volume in Table 3.3. This table also divides the major material categories into separate commodities that are of interest to the recycling industry. For example, paper is divided into newspaper (ONP), cardboard (OCC), ONP/OCC, office paper and other paper products. Many of the separate commodities represent those traded by the recycling community. Others, such as office paper, are an aggregate of commodities too numerous to list. Combinations, such as ONP/OCC, represent materials collected together that could not be separated for reporting purposes. Complete descriptions of each commodity are given beneath the table. The equivalent data by weight are given in Table 3.4.

Maricopa County continues to lead the state in waste diversion by recycling or diverting more material than any other jurisdiction during FY 1999. This is the result of the waste tire diversion program. For the third consecutive year, the County delivered used tires from its waste tire collection sites to local processing facilities. The tires are being recycled into crumb rubber for use in rubberized asphalt and other products, or diverted to become tire derived-fuel. The city of Phoenix remains the second largest waste diverting and recycling jurisdiction in the state. This is a result of its curbside recycling program which serves 80 percent of the city's single-family residences. Similarly, the city of Mesa recycles and/or diverts the third largest amount of material in the state. FY 1999 marked the third complete year of that city' s jurisdiction-wide curbside recycling program and the second complete year it has offered its residents a curbside greenwaste diversion program, that received partial funding through a 1997 WRA Grant.

The three jurisdictions noted above dominate the total amount of waste diverted from landfills, in part, due to their large populations. However, a more accurate measure of the success of a jurisdiction's efforts to divert material may be the jurisdiction's diversion rate. This is obtained by dividing the amount of diverted material reported from the jurisdiction by the amount of material generated. Table 3.5 lists each jurisdiction's total amount of material diverted during the FY 1999 and an estimate of the municipal solid waste generated during that time period. The amount of municipal solid waste generated is determined by multiplying the jurisdiction's population by 1.587 cubic yards per person per year. This is calculated using the national average of 4.4 pounds per person per day as reported by EPA.[1]

The method of obtaining diversion rates is speculative at best. The figure used as the average amount of waste generated per person per year is somewhat higher this year than last. Last year's conversion factor was 1.453 cubic yards per person per year. This difference is due to changes in the composition of municipal solid waste from year to year and uncertainties inherent in the individual conversion factors between tonnage and volume for each type of material.

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1 *Characterization of Municipal Solid Waste in the United States: 1998 Update*, United States Environmental Protection Agency, EPA/530-in print, July 1999.

Population figures may also be misleading. For instance, the population of Sierra Vista includes the U.S. Army base, Fort Huachuca, that has its own waste and recycling programs. This inflates the figures for solid waste generated by the City, while the City does not receive credit for material recycled by the military base. Other jurisdictions operate recycling facilities and receive material from outside the jurisdiction, thus inflating diversion figures. Counties have an advantage, as they may be responsible for diverting material for all residents, while the population figure used to calculate the county's diversion rate accounts only for citizens residing in unincorporated areas. Finally, in an effort to retain confidentiality, the ADOC Market Development Program cannot assign private recycling facility data to particular jurisdictions. Therefore, cities and towns serviced in whole, or in part, by private recycling haulers will have underestimated diversion rates. Due to these circumstances, accurate diversion rates can not be reported in all cases.

The city of Tolleson tops the list of highest diversion rates with a value of 189.4 percent. Any value greater than 100 percent is either the result of diverting materials that have been collected and stored for several years, or the result of having one community serve as the recycler for a regional program. In this case, Tolleson diverted a large amount of waste water treatment sludge that it had been storing. The City topped the list two years ago for this same reason. The town of Pinetop-Lakeside dropped from the highest diversion rate last year to the second highest rate with a value of 99.8 percent. Pinetop-Lakeside operates an in-vessel composting system that accepts a large percentage of the surrounding area's organic matter. Therefore, the diversion rate for the Town, itself, is lower. Maricopa County fell to the third highest diversion rate, 71.3 percent. The County is responsible for disposing of the largest number of waste tires in the state. County governments serve as the waste tire collection organization for all residents. Therefore, the counties have the advantage of receiving credit for diverting all the tires generated in their jurisdiction, while corresponding populations only reflect residents of unincorporated areas. Any tires reported recycled by cities and towns are subtracted from the county's total. However, few cities and towns take advantage of this opportunity, and those that do, rarely account for tires collected through private automotive shops. For the second consecutive year, Gila County reported the fourth highest diversion rate, 39.5 percent. Not only does Gila County divert waste tires, but they also have a greenwaste diversion program that is operated from their landfills that diverts significant amounts of organic material.[1] The city of Sedona has the fifth highest diversion rate, 30.6 percent. The bulk of the material is recycled through a drop-off program operated by a non-profit organization, Sedona Recycles. Much of the work is done by volunteers, that makes the amount of material recycled in the community even more commendable. In addition, the recycling center operated by Sedona Recycles accepts material from recycling programs in nearby communities and subscription-based curbside recycling programs.

[1]The County greenwaste diversion program was partially funded by a WRA Grant. For more information see Section V of this report.

Table 3.5: Solid waste generated and diverted by local government jurisdictions. This data is based on FY 1999. The source for population statistics is the Arizona Department of Economic Security, Research Administration, Population Statistics Unit. Volumes generated are determined by multiplying each jurisdiction' s population by 1.587 cubic yards per person per year,[1] the national average determined using data given by the EPA. The volumes that were reported as diverted may include non-municipal solid waste. This could result in the over estimating the diversion rate of some jurisdictions.

City	County	Population	Waste Generated (cu.yds)	Reported as Diverted (cu.yds)	Diversion Rate
Apache County	Apache	56,765	90,090.00	591.06	0.66 %
Apache Junction	Pinal	22,252	35,310.00	0.44	0.00 %
Avondale	Maricopa	27,370	43,440.00	21.38	0.05 %
Benson	Cochise	4,300	6,820.00	0.00	0 %
Bisbee	Cochise	6,573	10,430.00	175.00	1.68 %
Buckeye	Maricopa	7,280	11,550.00	2.28	0.02 %
Bullhead City	Mohave	29,870	47,400.00	0.00	0 %
Camp Verde	Yavapai	8,490	13,470.00	0.00	0 %
Carefree	Maricopa	2,785	4,420.00	0.00	0 %
Casa Grande	Pinal	22,362	35,490.00	4,028.50	11.35 %
Cave Creek	Maricopa	3,940	6,250.00	0.00	0 %
Chandler	Maricopa	160,430	254,600.00	45,025.98	17.68 %
Chino Valley	Yavapai	7,524	11,940.00	0.00	0 %
Clarkdale	Yavapai	2,951	4,680.00	0.00	0 %
Clifton	Greenlee	3,066	4,870.00	0.00	0 %
Cochise County	Cochise	46,672	74,070.00	5,004.15	6.76 %
Coconino County	Coconino	48,313	76,670.00	8,922.21	11.64 %
Colorado City	Mohave	3,997	6,340.00	0.00	0 %
Coolidge	Pinal	7,238	11,490.00	470.68	4.1 %
Cottonwood	Yavapai	7,040	11,170.00	2,664.36	23.85 %
Douglas	Cochise	15,383	24,410.00	994.76	4.08 %
Duncan	Greenlee	805	1,280.00	0.00	0 %

[1] 1998 update, EPA, July 1999.

City	County	Population	Waste Generated (cu.yds)	Reported as Diverted (cu.yds)	Diversion Rate	
Eagar	Apache	4,883	7,750.00	0.00	0	%
El Mirage	Maricopa	5,825	9,240.00	0.00	0	%
Eloy	Pinal	9,428	14,960.00	0.00	0	%
Flagstaff	Coconino	59,505	94,430.00	8,944.16	9.47	%
Florence	Pinal	11,707	18,580.00	470.25	2.53	%
Fountain Hills	Maricopa	17,770	28,200.00	0.00	0	%
Fredonia	Coconino	1,335	2,120.00	0.00	0	%
Gila Bend	Maricopa	1,815	2,880.00	0.00	0	%
Gila County	Gila	23,797	37,770.00	15,646.94	41.43	%
Gilbert	Maricopa	90,530	143,670.00	5,081.28	3.54	%
Glendale	Maricopa	204,035	323,800.00	42,845.28	13.23	%
Globe	Gila	7,504	11,910.00	0.00	0	%
Goodyear	Maricopa	14,385	22,830.00	509.15	2.23	%
Graham County	Graham	17,617	27,960.00	3,075.42	11	%
Greenlee County	Greenlee	5,037	7,990.00	523.70	6.55	%
Guadalupe	Maricopa	5,470	8,680.00	512.98	5.91	%
Hayden	Gila	911	1,450.00	0.00	0	%
Holbrook	Navajo	5,594	8,880.00	75.65	0.85	%
Huachuca City	Cochise	2,046	3,250.00	0.00	0	%
Jerome	Yavapai	587	930.00	90.05	9.68	%
Kearny	Pinal	2,577	4,090.00	0.00	0	%
Kingman	Mohave	19,372	30,740.00	0.00	0	%
Lake Havasu City	Mohave	43,176	68,520.00	4,483.46	6.54	%
La Paz County	La Paz	14,633	23,220.00	297.07	1.28	%
Litchfield Park	Maricopa	4,585	7,280.00	587.15	8.07	%
Mammoth	Pinal	2,011	3,190.00	0.00	0	%
Marana	Pima	11,791	18,710.00	0.00	0	%
Maricopa County	Maricopa	196,787	312,300.00	270,097.33	86.49	%

City	County	Population	Waste Generated (cu.yds)	Reported as Diverted (cu.yds)	Diversion Rate	
Mesa	Maricopa	375,725	596,280.00	77,477.43	12.99	%
Miami	Gila	2,059	3,270.00	0.00	0	%
Mohave County	Mohave	46,185	73,300.00	823.09	1.12	%
Navajo County	Navajo	52,363	83,100.00	5,154.30	6.2	%
Nogales	Santa Cruz	21,360	33,900.00	0.00	0	%
Oro Valley	Pima	26,470	42,010.00	0.00	0	%
Page	Coconino	8,833	14,020.00	197.48	1.41	%
Paradise Valley	Maricopa	13,160	20,880.00	81.69	0.39	%
Parker	La Paz	3,018	4,790.00	0.00	0	%
Patagonia	Santa Cruz	976	1,550.00	0.00	0	%
Payson	Gila	13,209	20,960.00	0.00	0	%
Peoria	Maricopa	88,365	140,240.00	0.00	0	%
Phoenix	Maricopa	1,263,895	2,005,800.00	212,598.60	10.6	%
Pima	Graham	2,088	3,310.00	0.00	0	%
Pima County	Pima	349,063	553,960.00	66,496.80	12	%
Pinal County	Pinal	76,333	121,140.00	12,753.51	10.53	%
Pinetop-Lakeside	Navajo	3,613	5,730.00	5,723.98	99.89	%
Prescott	Yavapai	33,581	53,290.00	2,835.87	5.32	%
Prescott Valley	Yavapai	22,008	34,930.00	23.36	0.07	%
Quartzite	La Paz	2,170	3,440.00	0.00	0	%
Queen Creek	Maricopa	4,150	6,590.00	0.40	0.01	%
Safford	Graham	10,304	16,350.00	0.00	0	%
Sahuarita	Pima	2,629	4,170.00	0.00	0	%
Santa Cruz County	Santa Cruz	14,314	22,720.00	3,642.21	16.03	%
San Luis	Yuma	11,163	17,720.00	96.89	0.55	%
Scottsdale	Maricopa	198,070	314,340.00	59,672.10	18.98	%
Sedona	Yavapai	9,877	15,670.00	4,830.24	30.82	%
Show Low	Navajo	7,672	12,180.00	0.00	0	%

City	County	Population	Waste Generated (cu.yds)	Reported as Diverted (cu.yds)	Diversion Rate	
Sierra Vista	Cochise	39,984	63,450.00	12,854.83	20.26	%
Snowflake	Navajo	4,437	7,040.00	0.00	0	%
Somerton	Yuma	6,577	10,440.00	49.19	0.47	%
South Tucson	Pima	5,745	9,120.00	0.00	0	%
Springerville	Apache	2,006	3,180.00	0.00	0	%
St. Johns	Apache	3,415	5,420.00	0.00	0	%
Superior	Pinal	3,505	5,560.00	3.74	0.07	%
Surprise	Maricopa	18,685	29,650.00	0.00	0	%
Taylor	Navajo	2,876	4,560.00	0.00	0	%
Tempe	Maricopa	162,120	257,280.00	42,802.60	16.64	%
Thatcher	Graham	4,236	6,720.00	0.00	0	%
Tolleson	Maricopa	4,450	7,060.00	13,369.08	189.36	%
Tombstone	Cochise	1,496	2,370.00	0.00	0	%
Tucson	Pima	467,455	741,850.00	47,641.52	6.42	%
Wellton	Yuma	1,219	1,930.00	0.00	0	%
Wickenburg	Maricopa	5,130	8,140.00	1,983.23	24.36	%
Willcox	Cochise	3,275	5,200.00	0.00	0	%
Williams	Coconino	2,862	4,540.00	583.47	12.85	%
Winkelman	Gila	418	660.00	0.00	0	%
Winslow	Navajo	11,220	17,810.00	241.95	1.36	%
Yavapai County	Yavapai	38,675	61,380.00	9,239.03	15.05	%
Youngtown	Maricopa	2,735	4,340.00	0.00	0	%
Yuma	Yuma	66,589	105,680.00	1,311.06	1.24	%
Yuma County	Yuma	45,889	66,680.00	4,370.91	6.56	%
Totals		4,848,221	7,687,220.00	1,010,002.71	13.14	%

From the information presented in Table 3.5, several preliminary conclusions concerning the relationship between certain types of recycling programs and diversion rates can be made. A jurisdiction having just a treecycle program (Christmas tree recycling), such as Goodyear and Superior, will have a diversion rate near 0.05 percent, but a particularly successful treecycle program may achieve a diversion rate as high as 0.2 percent. Drop-off recycling programs, such as Yuma, should reach a diversion rate between five and ten percent. However, extremely successful programs that involve surrounding communities, such as Sedona and Sierra Vista, can reach diversion rates of over 20 percent. Curbside recycling normally diverts between ten percent and 20 percent of the municipal solid waste stream. Chandler, Flagstaff, Phoenix, Scottsdale and Tempe are examples of such programs. Finally, adding greenwaste diversion to any of these programs will divert a significantly larger amount of waste as greenwaste comprises about 25 percent by weight of the municipal solid waste stream in Arizona[1]. Bisbee, Mesa and Sierra Vista are examples of jurisdictions offering curbside greenwaste diversion programs.

D. The Diversion Rate for Arizona

Although the diversion rates for individual jurisdictions can be misleading, a total diversion rate for Arizona can be determined as the ratio between the total volume of material diverted during FY 1999 and the total volume of waste generated within the state. This equation is given in Figure 3.2. The total volume of waste diverted from Arizona landfills during FY 1999 was 5,031.545 cubic yards. This is equivalent to the amount of landfill space saved by recycling and other methods of waste diversion, as the factors that convert tons to cubic yards account for compaction under landfill settings. Landfill data obtained by the ADEQ indicates that a total of 6,189,051 tons of waste was landfilled in FY 1999. Out-of-state waste accounted for 422,395 tons, and may be subtracted from the total. This leaves 5,766,656 tons as the amount of in-state waste landfilled. This can be converted to cubic yards by dividing by 0.5060 tons per cubic yard. The result is 11,400,000 cubic yards of in-state waste landfilled. The total volume of waste generated is the sum of the in-state waste reported as landfilled and the total waste reported as diverted, that is 16,610,000 cubic yards. The quotient between the total waste diverted and the total waste generated, multiplied by 100, results in a diversion rate of 30.3 percent. This is an increase from the 25.8 percent rate reported in FY 1998.

Common practice is to report diversion rates on the basis of tonnage. Since most data received from the solid waste and recycling industries is in tons and must be converted to cubic yards for this report, it is straight forward to determine a diversion rate based on tonnage. The state diverted 2,079,225 tons of material during the FY 1999. During that same time period 5,766,656 tons of in-state waste was landfilled. The tonnage of waste generated, therefore, is 7,935,901 tons. Using the same formula as above results in a diversion rate of 26.2 percent. This increased from 21.9 percent last fiscal year.

[1] 1998 update, EPA, July 1999

Figure 3.2: The mathematical equations and data required to determine the waste diversion rate for Arizona. The in-state waste landfilled can be found by subtracting the out-of-state waste landfilled from the total waste landfilled. To convert the entire waste stream from tons to cubic yards divide by 0.5060 tons/cubic yards. The total waste landfilled in tons is given in Appendix B. Total waste diverted can be found in Table 3.2

Diversion rate

Diversion Rate = $\frac{\text{(Total Waste Diverted) X 100}}{\text{(Total Waste Generated)}}$

Total Waste Generated =	In-State Waste Landfilled + Total Waste Diverted
In-State Waste Landfilled (Cubic Yards) =	(In-State Waste Landfilled)/(0.5060 tons/cubic yard)
In-State Waste Landfilled (Tons) =	Total Waste Landfilled - Out-of-State Waste Landfilled
Total Volume of Waste Diverted =	5,031,545 cubic yards
Total Tonnage of Waste Diverted =	2,079,225 tons
Total Waste Landfilled =	6,189,051 tons
Out-of-State Waste Landfilled =	422,395 tons

The difference between the two diversion rates is primarily due to the large number of waste tires diverted in Arizona. Tires weigh very little, yet they occupy a large area. Consequently, a moderate amount of weight is removed from landfills by diverting tires while a very large volume of the state's landfills is saved. It should be noted that not all landfills reported the composition of materials received. In addition, not all of the private recycling companies have answered the Recycling Market Development Study surveys. Therefore, these figures should be considered preliminary and conservative. ***For the most accurate and up-to-date information, please check the ADEQ Web site (www.adeq.state.az.us/waste/solid/recycle.htm), where continual updates to Arizona's diversion rates will be posted.***

E. The Recycling Rate for Arizona

To determine the recycling rate for Arizona, two corrections to the solid waste data must be made. First, only municipal solid waste can be considered when determining the amount of material diverted from the landfill and the amount of material entering the landfill. Second, materials diverted from the landfills by methods that are not considered true recycling must be removed from the diverted figures. The formula for Arizona's recycling rate is given in Figure 3.3. Explanations concerning how this is calculated, and concerns that need to be addressed follow.

As reviewed in Section II, pertaining to municipal solid waste generation, the Recycling Market Development Survey requested that landfills in the state identify what percentage of the material

Figure 3.3: The mathematical equations and data required to determine the recycling rate for Arizona. The

recycling rate is determined by a similar method as the diversion rate. However, corrections must be made to eliminate non-MSW and out-of-state waste from the diversion and landfill figures, and to eliminate material that was diverted by methods not considered true recycling. Total waste landfilled can be found in Appendix B, and total waste diverted can be found in Table 3.2.

Recycling Rate

Recycling Rate = $\frac{\textbf{(MSW Recycled) X 100}}{\textbf{(In-State MSW Generated)}}$

MSW Recycled =	MSW Diverted - MSW Diverted but Not Recycled
MSW Diverted =	Total Waste Diverted - Non-MSW Diverted
In-State MSW Generated =	In-State MSW Landfilled +Total MSW Diverted
In-State MSW Landfilled (cubic yards) =	(In-State MSW Landfilled (Tons))/(0.5060 tons/cubic yard)
In-State MSW Landfilled (Tons) =	In-State Waste Landfilled - In-State Non-MSW Landfilled
In-State Waste Landfilled (Tons) =	Total Waste Landfilled - Out-of-State Waste Landfilled
MSW Diverted but Not Recycled (Cubic Yards) =	119,453 cubic yards
MSW Diverted but Not Recycled (Tons) =	65,451 tons
Non-MSW Diverted (Cubic Yards) =	2,390,562 cubic yards
Non-MSW Diverted (Tons) =	1,055,216 tons
Total Waste Diverted (Cubic Yards) =	5,031,545 cubic yards
Total Waste Diverted (Tons) =	2,079,225 tons
In-State Non-MSW Landfilled =	1,603,348 tons
Total Waste Landfilled =	6,189,051 tons
Out-of-State Waste Landfilled =	422,395 tons

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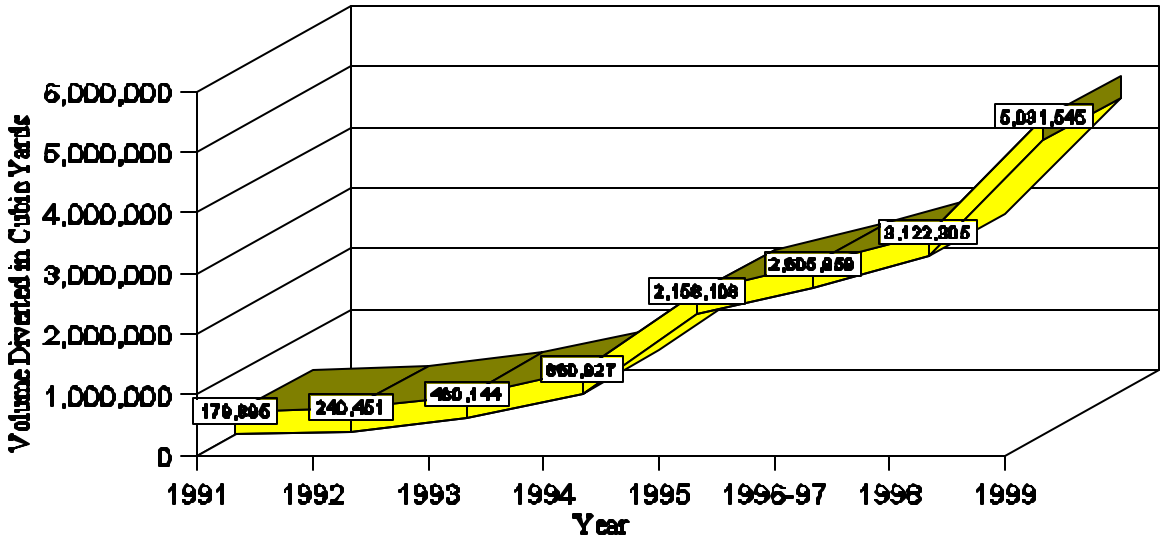
they accepted was out-of-state waste and what percentage was non-municipal solid waste (non-MSW). From the information they supplied this year, it can be determined that 4,163,308 tons of in-state MSW was landfilled. Converting this from weight to volume by dividing by 0.5060, results in 8,228,000 cubic yards.

As previously discussed, the amount of waste diverted must also be corrected to determine the recycling rate. First, the portions of the diverted waste stream that are not considered MSW must be removed. This includes auto bodies, sludges, construction and demolition debris, fly ash and pre-consumer materials. The total amount of non-MSW diverted is 2,390,562 cubic yards. Second, materials diverted by methods that are not considered true recycling must be removed. These methods include waste to energy processes and the reuse of items. Materials burned for energy in Arizona are limited to used oil and a portion of the waste tire stream. Wooden pallets repaired and reused in the agricultural industry represent the bulk of the items classified as reused. The total amount of MSW diverted by methods not considered true recycling is 119,453 cubic yards.

With these changes considered, a recycling rate for the FY 1999 can be calculated. The total volume of material diverted, but not recycled is 2,510,016 cubic yards. This leaves 2,521,529 cubic yards truly recycled. The amount of MSW generated equals the sum of the MSW landfilled and MSW diverted.

Figure 3.4: The growth in volumes of materials diverted from landfills in Arizona. These are volume amounts, in cubic yards, that were reported by jurisdictions in ADEQ' s Annual Waste Reduction and Recycling Questionnaire and by private recyclers in ADOC' s Recycling Market Development Study survey. Reporting periods changed from calendar year to fiscal year in 1996.



This is 10,690,000 cubic yards. The recycling rate is determined by dividing the amount of MSW recycled by the amount of MSW generated and converting it into a percentage. The result is a recycling rate of 23.2 percent by volume. This is an increase from 18.5 percent for FY 1998. The same method, using weight rather than volume, yields a recycling rate of 15.7 percent. This figure increased from the 14.3 percent reported last year. The recycling rate for the nation, based on tonnage, was 28 percent for 1997,[1] the last year for which figures are available. Therefore, Arizona is below the national average.

As with the diversion rate, the difference between the recycling rate by volume and the recycling rate by weight is due to the large amount of tires recycled. As previously stated, these figures are preliminary and conservative. ***For the most accurate and up-to-date information, please check the ADEQ Web site, (www.adeq.state.az.us/waste/solid/recycle.htm), where continual updates to Arizona's diversion rates will be posted.***

F. Historical Trend in Volumes Diverted/Recycled

A 41.4 percent increase in the total volume of material diverted occurred during FY 1999. This figure will change as private recycling figures are completed. Figure 3.4 illustrates the growth in the amount of material reported diverted in Arizona over the past nine years. During that period, the volume of material diverted has risen from 179,895 cubic yards to 5,031,545 cubic yards. This is an increase of 2,439 percent.

[1] 1998 update, EPA, July 1999.

During this same period, the diversion rate increased from 1.9 percent to 28.6 percent. These increases can be attributed to more and larger recycling programs, including programs that began or expanded due to ADEQ recycling grant funds, and better information gathering and reporting by the recycling community.

G. Residential Curbside Recycling Programs

The most convenient method for citizens to recycle is through residential curbside recycling. In most cases, a recycling bin is supplied to each household. Often times a recycling pick-up day occurs once a week and a solid waste (garbage) pick-up day occurs once a week. This reduces the effort needed from each individual citizen, as compared to other types of recycling, and helps promote the recycling habit. Due to this convenience, residential curbside recycling is the major source of recyclable material collected by public jurisdictions.

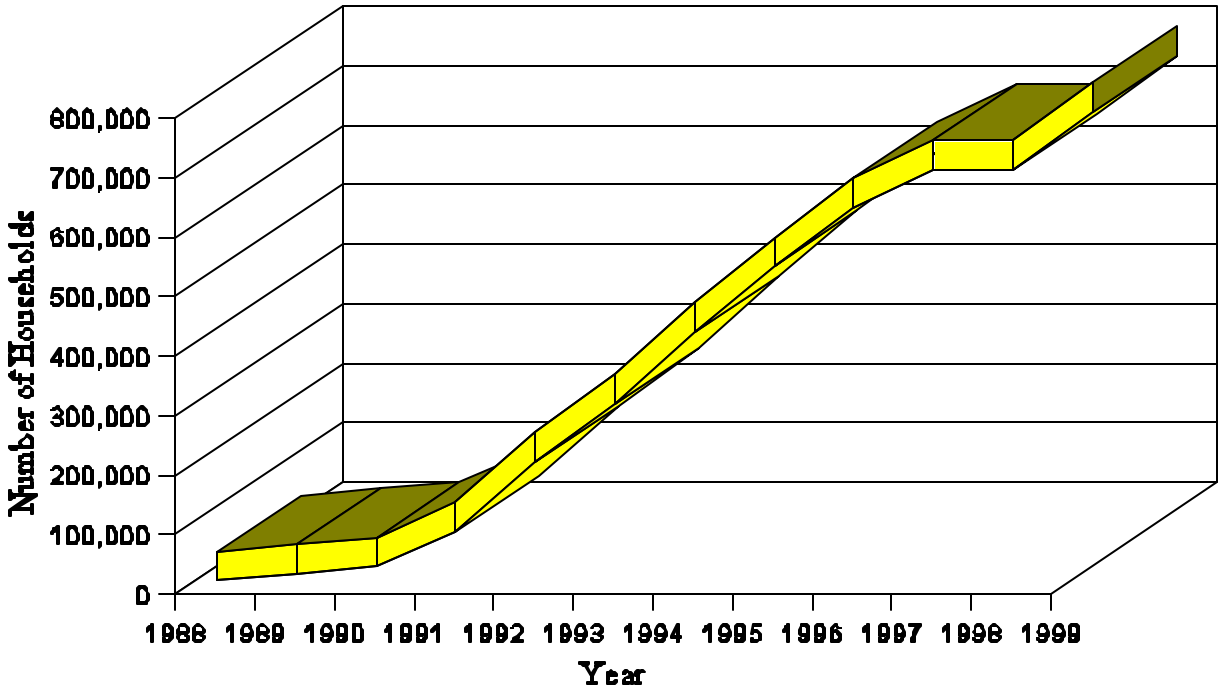


Figure 3.5: The growth of curbside recycling. The period between 1988 and 1991 reflects the initiation of small pilot curbside recycling programs. Since 1992 the implementation of larger programs has sustained a rapid growth in the number of households being offered curbside recycling.

Table 3.6: Growth in the number of jurisdictions offering curbside recycling and households having the

opportunity to participate. Figures are estimates for December 31st of each year. 1999 figures are based on program status as of July 1, 1999.

Year	Number of Households	Number of Jurisdictions
1988	1,000	1
1989	13,000	4
1990	24,000	7
1991	82,000	15
1992	200,000	24
1993	298,000	29
1994	418,000	32
1995	528,000	32
1995	628,000	28
1997	692,000	33
1998	691,000	22
1999	788,000	25

A residential curbside recycling program is defined as any program that collects a variety of materials left in close proximity to their sources on a regularly scheduled basis. The program requires the collection of one recyclable material other than greenwaste or white goods. Material can be collected at the curb or alley for single-family residences. Multi-family complexes are included if on-site recycling containers are provided. The recyclable materials may be source separated, sorted at the curb, commingled or the complete residential waste stream sorted at a "dirty MRF." Scheduled collection must be at least once per month. Curbside recycling programs may be operated by large waste hauling companies, municipal solid waste management departments and small businesses. They occur in both metropolitan and rural areas. The city of Phoenix, population 1,263,895, operates the state' s largest curbside recycling program. While, the town of Jerome, the second smallest incorporated area in Arizona, population 587, operates one of the smallest.

The growth of curbside recycling is illustrated in Figure 3.5 which shows the number of households participating in curbside recycling programs by year. Though the city of Tucson had residential pick-up of newspapers for recycling in the 1970s, residential curbside recycling in Arizona as we know it today began in 1988. At that time, the city of Tempe initiated its first pilot program servicing 816 homes. Since that time, residential curbside recycling programs have operated continuously and have steadily grown in size. From 1988 to 1991, small pilot curbside recycling programs were introduced. In 1992, the town of Gilbert became the first jurisdiction to offer curbside recycling to all single-family homes.

Since that time, curbside recycling has shown a rapid growth as large metropolitan cities began implementing jurisdiction-wide curbside programs. By the mid-1990s, the number of jurisdictions offering this type of recycling leveled off, while the number of households continued growing rapidly (Table 3.6).

From 1996 to the present, low commodity prices forced collection programs in marginally profitable routes to close, thus the number of curbside recycling programs began to fall. During 1996 and 1997, the aggressive implementation of the city of Scottsdale' s curbside recycling program and the expansion of the program operated by the city of Mesa kept the number of households rising. Then in 1998, a slight reduction in the number of households participating in curbside recycling programs in Pima County resulted in a small decrease in the total number of participating households in the state for FY 1998. However, in 1999 jurisdiction-wide recycling programs began in Flagstaff and the nearby city of Williams. Both programs became possible with the opening of the Flagstaff Recycling Facility operated by Norton Environmental.

The future outlook of curbside recycling is positive, but the time of rapid growth is drawing to a close. During FY 2000, the number of communities offering curbside recycling and the number of households participating are expected to increase as the city of Glendale opens its materials recovery facility and offers curbside recycling to its 48,200 households. Hopefully, nearby cities will join Glendale and use the excess capacity of its city' s facility to offer curbside recycling to their residents. The city of Phoenix may also complete its program expansion in the year 2000 to its residents. However, almost all of the major metropolitan cities in Arizona have instituted a curbside recycling program. The cities of Peoria and Yuma are the only other cities with populations over 50,000 that do not have curbside recycling. Therefore, the growth of curbside recycling will, once again slow as the state enters the next millennium.

H. Other Public and Private Programs

Other recycling programs include curbside greenwaste diversion, commercial recycling, special event curbside pick-up of recyclable materials, drop-off programs, buy-back centers and household hazardous waste collections.

I. Summary

The response rate to the FY 1999 Solid Waste Reduction and Recycling Questionnaire was 84.3 percent. The respondents represented 99.0 percent of the state's population.

The total volume of material reported recycled or diverted from the landfills in FY 1999 is 5,031,545 cubic yards. This represents an increase of 41.4 percent over FY 1998. ***These are preliminary and conservative figures and continuous updates will be supplied on ADEQ's Web site (www.adeq.state.az.us/waste/solid/recycle.htm). Please refer to the Web site for the most accurate information.***

The volume of material diverted by individual jurisdictions are closely tied to their populations. Recycling rates for individual jurisdictions may be misleading and close investigation is required when comparing one jurisdiction to another.

The diversion rate based on volume for Arizona during the FY 1999 is 30.3 percent based on volume and 26.2 based on weight. These, also, are preliminary figures and will be updated on the Web site.

The recycling rate for Arizona during the FY 1999 was 23.2 percent based on volume, and 18.5 percent based on weight. The difference is the result of the large number of waste tires recycled. These are also preliminary figures.

There are currently 25 jurisdictions in Arizona offering curbside recycling. A total of 788,000 households have the opportunity to recycle using this method. Though the number of households has the potential to keep rising, the period of rapid growth appears nearly over.

IV. Costs and Revenue

The Arizona Solid Waste Recycling Statute (A.R.S.§49-832.C.4.) requires that the following information be reported annually:

- The costs of operating and maintaining recycling programs,
- The revenue from the sale or use of recycled materials for existing programs, and
- The costs avoided in processing or disposal.

An analysis of the cost and revenue data reported by governmental jurisdictions can provide a general idea of the financial aspects of recycling programs in operation around the state. This year, 34 jurisdictions provided information regarding costs and revenues in response to the Arizona Recycling Program's annual questionnaire. Unfortunately, there are insufficient data to provide a complete analysis. The challenges and issues regarding costs and revenues for recycling programs vary greatly, therefore, jurisdictions should not be directly compared. Table 4.1 provides the information reported by jurisdictions.

A. Costs of Recycling Programs

The cost of operating and maintaining each jurisdiction's recycling program includes, when applicable: land, insurance, equipment, personnel, overhead, consultants, construction, additional procurement programs (buy recycled) and other related costs. Some jurisdictions indicated that the costs reflect several different types of recycling programs, while others stated that costs reflect a specific type of recycling program, such as funding a household hazardous waste event. Also, a jurisdiction's operational expenses may change significantly from year to year due to the purchase of capital equipment.

The data from jurisdictions who reported this information show that costs ranged from as low as $100 per year for the town of Guadalupe, to as high as $54,668,847 for the city of Phoenix. The city of Mesa spends the second highest amount, $3,330,642 in operation and maintenance costs, while the city of Tucson is third with $1,779,270.

B. Revenues of Recycling Programs

Funds from the resale of a usable item or the sale of a recyclable item qualify as revenues of recycling programs. The greatest amount of revenue reported was $1,854,126 from the city of Phoenix, an increase of $757, 908 from the previous year. The least amount of revenue reported by those jurisdictions responding was $400 by the town of Guadalupe. The total revenue generated statewide, based on the 34 reporting jurisdictions, was $2,541,038 up

$94,947 from the previous year.

C. Avoided Costs Due to Recycling Programs

Avoided costs are neither revenues nor funds received, but cost savings by diverting solid waste from the landfills. These avoided costs should be considered when evaluating the cost effectiveness of a recycling program. Avoided costs represent what would be paid to landfill, incinerate or otherwise legally dispose of the solid waste. Typically, this estimate is based on the disposal or tipping fees, that would have been charged had the solid waste been landfilled, but many include other landfill operation costs. For example, landfill operation cost avoidance can reflect the reduction of maintenance on landfill equipment, due to the diversion of such items as scrap metal. It is also important to consider the costs avoided for citing and constructing a new landfill, due to the landfill space saved by waste diversion.

A total of $3,016,664 was realized as avoided costs by those jurisdictions that reported this fiscal year. The avoided costs ranged from $120 for the town of Payson to $1,314,819 for the city of Phoenix.

D. Cost/Revenue Comparison

There are many challenges when comparing the costs and revenues of recycling programs. Each jurisdiction does not offer the exact same combination of recycling programs nor financing methods for programs. Jurisdictions may offer a variety of recycling programs or only one specific program type. The types of recycling programs offered range from: curbside to drop-off collection, household hazardous waste collection year-round to individual events, Christmas tree drop-offs to curbside collection of greenwaste to white goods collections. The costs associated with each jurisdiction' s recycling program may represent several programs or just one.

Some jurisdictions indicated that recycling program funding is mixed with other solid waste programs, and thus, cannot be identified specifically as recycling costs. Furthermore, debate exists regarding financial issues within the recycling and solid waste industry, due to the range of definitions of revenue, avoided costs and operational costs. Some jurisdictions have a contract with private recycling companies to collect, sort and broker the material. As a result, these jurisdictions are not necessarily privy to financial information. The financial figures of the private companies may not be represented in this report. Other jurisdictions may operate a recycling program as well as the landfill. In such a scenario, the avoided costs of paying less tipping fees for recycled material that was diverted from the landfill may be viewed as a loss of revenue for the landfill operation and may not be reported. Therefore, the cost and revenue comparison is only an approximate analysis due to the difficulty in achieving consistent statewide definitions of a recycling budget and types of programs offered. Each jurisdiction should be evaluated separately. The cost and revenue comparison only addresses the financial aspects of recycling. There are also indirect savings and relative benefits that are difficult for individual jurisdictions to quantify in dollars, but should be considered in overall program evaluations. These include resource conservation, energy savings and a reduction in pollution.

Table 4.1 The Cost, Revenue and Avoided Costs of Operating a Recycling Program in Arizona. Only cities reporting data are included in this table. Jurisdictions should not be directly compared due to the differences in what each considers costs and revenues.

Jurisdiction	Population	Operational Cost ($)	Revenue ($)	Avoided Costs ($)
Bisbee	6,573	$60,000.00		$8,073.00
Casa Grande	22,362	$339,245.00		
Chandler	160,430	$1,364,760.00	$473.00	
Cochise County	46,672	$28,065.49		
Coconino County	48,313	$2,400.00		
Coolidge	7,238		$683.40	
Flagstaff	59,505	$1,000,702.00	$42,000.00	$7,845.39
Florence	11,707		$537.45	$17,200.00
Glendale	204,035	$554,922.00	$227,211.07	$42,588.74
Graham County	17,617	$36,512.00		
Goodyear	14,385	$13,500.00		
Guadalupe	5,470	$100.00	$400.00	$2,000.00
Holbrook	5,594	$30,000.00	$800.00	$5,000.00
Lake Havasu City	43,176	$192,000.00	$117,914.00	$44,475.20
La Paz County	14,633	$35,280.00		
Mesa	375,725	$3,330,642.00	$80,250.00	$502,100.00
Page	8,833	$5,000.00		$10,000.00
Paradise Valley	13,160	$2,350.00		$8,000.00
Payson	13,209			$120.00
Phoenix	1,263,895	$54,668,847.00	$1,854,126.00	$1,314,819.00
Pima County	349,063	$335,000.00		
Pinal County	76,333	$173,676.74	$16,332.87	$489,272.50
Prescott	33,581	$200,511.00	$12,447.00	$51,531.00
San Luis	11,163	$3,700.00		$4,000.00
Santa Cruz County	14,314	$6,624.95	$1,120.07	
Scottsdale	198,070			
Sierra Vista	39,984	$50,000.00	$12,312.00	$62,670.00
Tempe	162,120			$165,358.50
Tucson	467,455	$1,779,270.00	$168,431.00	$185,829.00
Wickenburg	5,130	$15,000.00		$76,006.00
Williams	2,862		$6,000.00	$8,455.50
Winslow	11,220			$2,000.00
Yuma	66,589			$9,320.00
Yavapai County	38,675	$136,000.00		
Total	**3,819,091**	**$64,364,108.18**	**$2,541,037.86**	**$3,016,663.83**

V. Recycling Grants

A. Historical Overview

Pursuant to A.R.S. §49-837.B.1-2, the Arizona Recycling Program administers a grant program that provides financial assistance or start-up money to political subdivisions, nonprofit and for-profit organizations in Arizona. Throughout 1991 and 1992, the recycling grant was referred to as the Reduce, Reuse and Recycle Grant (3R Grant). The funding was awarded to projects that focused on source reduction of solid waste and source reduction education. In 1993, the 3R Grant was separated into two types of grants: the Waste Reduction Assistance (WRA) and Waste Reduction Initiative Through Education (WRITE) Grants. Applications to both the WRA and WRITE Grants typically include public jurisdictions, as well as, for-profit and non-profit entities. However, in FY 1996, a WRA Grant focusing exclusively on household hazardous waste projects was made available only to local government jurisdictions.

In an effort to address the difficulties associated with recycling in rural communities, in FY 1997, a WRA Grant was made available to only individuals and organizations established or residing in a jurisdiction with a population of 100,000 or less. In FY 1998, another specialized grant was develop to address research and development in recycling. This grant was named the Waste Reduction Assistance Research and Development (WRA R&D) Grant.

The focus of the WRA Grant is to provide funding to projects that divert significant amounts of material from the solid waste steam, or that represent comprehensive programs designed to achieve high solid waste diversion levels. All projects must be related to one or more of the following: the proper disposal of solid waste, source reduction, reuse, recycling, buying recycled content products and composting.

The focus of the WRITE Grant is to provide Arizona citizens with the information and education to increase their awareness for properly reducing and disposing of solid waste and to encourage participation in source reduction, reuse and recycling. The types of education projects may include, but are not limited to, school curricula, workshops, seminars, publications, mail outs and flyers, and mass media campaigns. The WRITE Grant projects assist ADEQ in its mandate to provide recycling education to the public.

The focus of the Research and Development Grant is to develop tools and ideas and create knowledge that will help to divert significant amounts of material from the solid waste stream in the future.

Since the Arizona Recycling Program' s inception in 1990, it has provided over $6.1 million in grant funding (see table 5.1). Sixty-two grants were awarded to public jurisdictions, 51 grants to private sector businesses/organizations, 46 grants to non-profit organizations and 10 grants to universities and colleges; totaling 169 different recycling related projects.

Table 5.1: Grant Programs and Funding Amounts. This table lists the type of grant programs and the amount of funding awarded during each fiscal year. Grant programs include: Reduce, Reuse, Recycle (3R), Waste Reduction Education (WRE), Waste Reduction Assistance (WRA), Waste Reduction Initiative Through Education (WRITE), Household Hazardous Waste (HHW), Small Community Waste Reduction Assistance (SCWRA) and Waste Reduction Assistance Research and Development (WRA R&D).

Fiscal Year	RRR	WRE	WRA	WRITE	HHW	SCWRA	WRA R&D
1991	$867,402						
1992	$640,000						
1993		$150,000					
1994			$447,282				
1995				$210,472			
1996					$1,217,977		
1997			$420,242			$332,509	
1998			$599,616	$222,485.50			
1999			$547,521	$258,723			$203,314
Totals	$1,507,402	$150,000	$2,014,661	$691,680.50	$1,217,977	$332,509	$203,314

B. Waste Reduction Assistance (WRA) Grants

1. The FY 1997 WRA Household Hazardous Waste Grant

The Household Hazardous Waste (HHW) Grant program was established by the Arizona Recycling Program to support local jurisdictional efforts in the operation of safe, effective and efficient HHW collection and disposal programs. Nine projects were awarded grant funding totaling $829,213 for FY 1997. A number of these projects formed city/county coalitions offering more services to their residents; others implemented or expanded existing programs. As FY 1997, came to a close, a majority of the jurisdictions requested extensions due to unforseen circumstances including, but not limited to: 1) extended contract negotiations with local businesses, 2) coordination of events and reports by multi-jurisdictional projects and 3) staff turnover. All but one of these projects were completed by the end of FY 1998. The following is an overview and assessment of the one WRA-HHW grant project that was completed in FY 1999:

City of Tempe
"Household Products Collection Center"
Mr. Jack Travers
31 East Fifth Street
Tempe, AZ 85281
(480) 350-8200
Grant Award: $300,000

Proposal:
The city of Tempe proposed to construct a permanent HHW collection facility. The facility would be open two to three days each week for residents of Tempe and Guadalupe to properly dispose of HHW. The facility would be staffed and managed by the City's Environmental Services Division. The City planned to build the facility on existing City-owned land, although a site had not been determined upon submittal of the proposal.

Project:
Because of lengthy delays due to site location approval, lease agreement negotiations and permitting processes, the city of Tempe was awarded an extension through April 1999. During FY 1998, the city of Tempe located a site at the corner of University Drive and Dorsey Lane for the permanent Household Products Collection Center and finalized a land lease agreement with Arizona Public Service (APS). Facility plans were finalized, permit applications were submitted and interviews were scheduled for the hiring of new personnel. In April 1998, the City obtained construction bids for the project, all of which greatly exceeded the architect's original cost estimate. The City was able to secure additional funding, which compensated for the cost difference. The city of Tempe was approved for numerous extensions. The facility was completed in April 1999, and began accepting HHW materials at that time.

Assessment:
The city of Tempe's Household Hazardous Products Collection Center was opened on April 22, Earth Day, 1999. There were representatives from the City, including Mayor Giuliano; APS; ADEQ; and the general public at the grand opening. The facility has been accepting material since its opening, and has received an overwhelming positive reaction from the residents of Tempe and Guadalupe. By June 5, 1999 the facility had been visited by 445 cars and had collected more than eight tons of oil, antifreeze, hazardous material and latex paint. With the facility still in its early stages of operation, the City was refining and improving its collection and processing methods. It was the expectation of both the City and ADEQ that this facility will continue to be an invaluable resource to the community and it was hoped that it would be a harbinger of HHW management practices in the Phoenix metro area.

2. FY 1998 WRA Small Community Grant

In August 1997, the Arizona Recycling Program awarded eight Small Community Waste Reduction Assistance (WRA) Grants, totaling $332,509. This particular WRA Grant was offered to any organization or individual established or residing in a jurisdiction with a population of less than 100,000. Eligible participants of this FY 1998 WRA Grant included public agencies, private businesses and nonprofit organizations. Below is a listing of the Small Community Grant projects that were not completed as of the end of FY 1998, and therefore not assessed in last year's annual report. This was their status as of June 30, 1999.

Arkay Enterprises
"Winner' s Circle Soils, Inc."
Mr. Keith Baldwin
P.O. Box 128
Taylor, AZ 85939
(520) 536-7398
Grant Award: $60,000

Proposal:
Winner' s Circle Soils, Inc. (d.b.a. Arkay Enterprises), a composting operation, provided compost products to communities within a 200-mile radius of Taylor, AZ. Arkay Enterprises developed a compost of wood waste and organic/vegetative material as an option in reducing solid waste. Arkay planned to use the grant funding on the purchase of a tub grinder, development of a new compost product and marketing of the product.

Project:
Arkay entered into an agreement with the Abitibi Consolidated paper mill in Snowflake to accept the mill' s wood waste. At the same time, Arkay began proceedings for the lease to ownership conversion on the tub grinder, as well as the development of a brochure for their new product line and marketing of that line at the 1997 Arizona "Buy Recycled Expo." One of the nation' s leading industry publications for composting featured a community profile for the Pinetop-Lakeside area in the fall of 1997. This coverage helped the Arkay composting project expand their retail market to include a Northern Arizona-based nursery. In addition, Arkay partnered with the local middle school on a gardening and landscape beautification project. Through this partnership, Arkay donated some of the new Winner' s Circle Soils product and provided an educational component to the project. This project was completed in August 1998.

Assessment:
Through the course of this project Arkay was able to divert over 11,200 tons of green and industrial wood waste. As well, they logged nearly 1000 hours of operation on their tub grinder. Arkay Enterprises experienced a 40 percent increase in sales over the period of their grant and were able to make great additions and expansions to their operations. The impact that this company has had on their local community has been great in areas of developing beautification and endangered and threatened species recovery projects. Arkay planned on entering the markets of Phoenix and Tucson.

Cottonwood-Verde Valley Recycles
"Compost & Recycling Program"
Ms. Belle Starr
1281 Burnside Road
Sebatopol, CA 95472
(707) 829-6469
Grant Award: $10,000

Proposal:
Cottonwood-Verde Valley Recycles (C/VVR) proposed to expand their existing plastics recycling program. The program is based in Cottonwood, and a similar program was to be implemented in Camp Verde. Recycling

bins would be located in key locations in Cottonwood and Camp Verde for easy access and community encouragement to recycle. Prior to the expansion of the plastics recycling program, C/VVR planned to implement a comprehensive educational and advertising campaign. Promotion of the program was scheduled to air on radio and in print. Issues that would be addressed included: program expansion, bin location, acceptable materials and preparation of those materials.

Project:

The goals of this rural grant appeared to be easily attainable. However, due to some circumstances beyond their control, C/VVR encountered many challenges during the first several months of this project. During the first six months, roll-off containers were placed at local grocery stores in Camp Verde and Cottonwood with signage that provided instructions on acceptable recyclable items. Simultaneously, flyers were developed and distributed, and extensive radio and print advertising took place. This promotion was ongoing throughout the contract period. In the midst of the pilot project, however, a national waste hauler purchased the locally owned hauler, with whom C/VVR had been working. The new company attempted to honor the existing agreement, but since the hauling services for this recycling program were being provided pro bono, paying customers had first priority. Although C/VVR monitored both sites diligently, they had little control over the frequency of pick ups. Unfortunately, the Camp Verde recycling site was shut down in late April 1998, due to complaints by the property owner regarding site maintenance and frequency of pick ups. In an attempt to maintain the remaining site in Cottonwood, C/VVR focused efforts on continued promotion and advertising of this site, as well as educating the public on the larger picture of how to attain source reduction. This project was completed in August 1998.

Assessment:
C/VVR worked with the local hauler and the manager of the business where the pickup site was located to establish a plan to collect materials in a timely manner. Due to the challenges that the organization encountered, it spent twice as much time in the coordination of its bins as they had originally proposed. Although C/VVR cited some major hurdles, it was able to complete its project on time and under budget. The education component was well received by the community and its success could be measured by the increase in materials collected and the decrease of contaminants. The project was able to collect approximately 125 tons of materials. These materials included plastic, aluminum, steel cans, newspaper and cardboard.

THE CITY OF DOUGLAS

City of Douglas
"Recycling Upgrade & Expansion"
Ms. Edna Elias
425 Tenth Street
Douglas, AZ 85607
(520) 805-4077
Grant Award: $32,120

Proposal:
The city of Douglas had operated a recycling program since 1994, and it had made a commitment to fund the program with an annual budget of $30,000. However, the program budget could not cover the cost of the upgrades necessary to improve efficiency and, consequently, reduce operation costs. With grant funding, the city of Douglas proposed to accomplish the following tasks: 1) provide collection containers for white office paper for Douglas schools, 2) provide signage for the recycling center, 3) create educational brochures and promotional materials to increase awareness and participation, 4) install cages for materials processing and 5) construct a building to store recyclables and reduce exposure to weather conditions.

Project:
The city of Douglas was delayed in completing several project-related tasks. One of the major changes that took place early in the contract period was a change in key personnel. During the first six months of this project, the City was able to accomplish the following tasks: 1) begin construction of a loafing shed at the recycling center, 2) purchase educational materials and develop bi-lingual recycling brochures, 3) hire a new recycling staff member, 4) purchase recycling bins for area schools and 5) implement office paper and cardboard recycling programs at schools, City offices and the local hospital. This project was completed in August 1998, but the final report was received in October 1998.

Assessment:
Although this project was delayed in its completion, it was beneficial to the program and came in under budget. The total amount of materials diverted was 829 tons. This represented an increase of 35 percent above average in the amount diverted from past years. The city of Douglas recognized over $7,700, or a 66 percent increase above average, in over-all cost savings. The project was made viable by its use of reliable inmate labor for collecting, sorting, bailing and cleaning. The materials that the City accepted were greenwaste, cardboard, newspaper and office paper. It also accepted plastics for a short time. By far, the largest amount of material collected was greenwaste, totaling almost 565 tons.

ECO, Inc.
"Recycling Association of Maricopa"
Ms. Maureen Scholz
42951 West Mayer Road
Maricopa, AZ 85239
(480) 753-0723
Grant Award: $54,635

Proposal:
Environmental Concerns Organization, Inc. (ECO) planned to re-open the transfer station in the community of Maricopa as a recycling collection facility in order to provide a convenient, comprehensive and cost effective recycling program to the community. To avoid problems associated with little or no waste disposal options or recycling opportunities, ECO included the following goals for this project: 1) the collection of recyclable materials at the transfer stations and through a mobile recycling unit, 2) the marketing of recyclable materials through the Southwest Public Recycling Association, 3) the education of the public on topics such as source reduction, recycling, composting, county recycling programs and waste hauling companies and 4) the marketing and distribution of products made from recycled content materials.

Project:
In just a few months, ECO was able to: 1) purchase a pick-up truck and trailer; 2) purchase recycling containers; 3) clean up the transfer station site; 4) purchase and set up a computer database to track volume and participation, network with similar programs and market recycled content products; 5) develop educational brochures and 6) prepare for program start-up. ECO held the grand opening of its recycling center on the first "America Recycles Day" on November 15, 1997. Shortly thereafter, ECO staff attended the Arizona "Buy Recycled Expo" to promote their newly formed program. ECO was extremely successful in scheduling local outreach events and getting coverage in area newspapers. As a result, they received more recyclables than anticipated, and were looking at ways to handle the ever-increasing volume of materials. ECO staff found that, due to an inadequate volunteer base and a limited number of containers, they were unable to implement the mobile recycling unit. Because of this setback, some area businesses and a few remote Pinal County communities were not receiving the same recycling opportunities as their neighbors. In order to address these needs, ECO proposed to reallocate cost savings toward the purchase of additional containers, reduce the number of outreach events, and put more energy into the implementation of the mobile unit. ECO then found that the participation rate with the mobile unit was not as expected and they changed this aspect to a satellite program at the end of the project term. In order to make these changes, ECO requested an extension of the grant project. This request was approved by ADEQ with completion date of November 1998, however the final report was not received until March 1999.

Assessment:
Although ECO was delayed in the submittal of their final report, they provided a comprehensive model for like programs. They were able to adapt well to the challenges and changes presented to them throughout the project's duration. ECO was able to recycle over 71 tons of material through their project. They participated in numerous recycling events and received the "Governor's Pride Award, Special Merit," for recycling. ECO's marketing division (d.b.a. ECO One Earth Products) was established during this grant period and paid for approximately 12 percent of their operation expenses. Although ECO discontinued their mobile unit program, they used a satellite drop-off center system at three locations in their community instead. They are planned on

improving their bailing technology and adding a "Pay as You Throw" trash collection program.

Norton Environmental, Inc.
"Flagstaff Glass Pulverizing System"
Mr. Louis Perez
6200 Rockside Woods Boulevard, Suite 105
Independence, OH 44131
(216) 447-0070
Grant Award: $60,000
Amended Award: $9,500
Total Award: $69,500

Proposal:
A new material recovery facility, being designed, built and operated by Norton Environmental, was scheduled to open in the spring of 1998 in Flagstaff. After completing a market overview, the city of Flagstaff's Recycling Office approached Norton Environmental to develop a more aggressive glass recycling program. Glass recycling has been difficult to maximize in Arizona due to poor market economics. In order to market the glass, it must be pulverized. With the assistance of grant funding, Norton Environmental planned to implement a complete pulverizing and screening system for glass with the following benefits: 1) expand the life of the landfill through recycling, 2) provide a local market source for recycled glass, 3) increase economic development for the community and 4) provide cost savings to local sand and gravel companies.

Project:
Due to the scope of this project, bad weather conditions and the public/private partnership, there were extensive delays on project finalization. Norton Environmental continued to be diligent in working through various local issues. Toward the end of the FY 1998, limited, but crucial, progress was made. Norton requested an amendment of the grant project in both time and funds. The request was approved by ADEQ. The city of Flagstaff, Norton Environmental and the Arizona Recycling Program provided increased funding for the construction of a walled enclosure to insure that this project followed City ordinances. Norton Environmental purchased an "Andela Glass Pulverizer System" for this project. Norton Environmental accepted glass not only from the city of Flagstaff's curbside program, but also from surrounding communities and local businesses. The project was completed in April 1999.

Assessment:
The Flagstaff pulverizer project was successful in diverting glass from the landfill and created a new market source for recovered glass. The Flagstaff pulverizer project was also a prime example of what could be done when the focus is directed towards market development. The expected diversion of glass by this project was to increase 530 percent to 504 tons of glass per year from the past recovery programs, with possibly more glass coming from partnerships with local commercial generators. Although there were several obstacles placed in the path of completion of this project, all the partners involved showed great support and a willingness to work together to find a way to make this project successful.

Palo Verde Valley Disposal Service
"Southern La Paz County Cooperative
Recycling Program"
Mr. Gordon Beers
14701 South Broadway
Blythe, CA 92225
Grant Award: $48,855
(800) 922-2278

Proposal:
Palo Verde Valley Disposal Service (PVVD) proposed to facilitate a project supporting local communities of southern La Paz County through the implementation of a waste reduction program. With the formation of such a comprehensive local program using existing public and private resources, the project would enhance maximum feasible waste diversion levels. This program planned to accomplish the following: 1) establish a permanent and convenient recycling system for permanent residents, 2) establish recycling opportunities for seasonal visitors, 3) reduce landfill disposal and 4) create potential revenues from the sale of recovered materials.

Project:
This comprehensive waste reduction project was awarded to PVVD, which is located in Blythe, California. Blythe borders western Arizona, specifically southern La Paz County. PVVD outlined a region-specific, waste reduction program that would affect both residents and businesses in the area. Along with a standard estimate of waste generation and recycling potential for the 7,000 residents of Quartzite, Salome, Wendon, Bouse and Ehrenberg, the company projected the same statistics during the winter months, when the region's population typically peaks at over 250,000 residents. A recycling program was then implemented, along with the development of an education and public outreach campaign. This campaign covered everything from a Master Recycler course, offered through the University of Arizona Cooperative Extension, to partnering with local chambers of commerce, to forming a coalition with the local economic development offices. In addition, job duties were revised for the education outreach coordinator and community coordinator to include waste reduction and recycling education. A media campaign was developed and a recycling newsletter was established. A county-wide school recycling program has been implemented and field trips to visit the regional landfill and the PVVD recycling center in Blythe, CA were offered to residents. Not only has PVVD been responsible for planning, coordinating and implementing all of these tasks, but they also monitored the program's progress and track waste diversion statistics. A final report was submitted upon completion of the project in August 1998, and provided a comprehensive overview of the program's challenges and successes.

Assessment:
This program accomplished its goal of bringing recycling to La Paz County. It established a permanent and convenient recycling system for year-round residents and seasonal visitors at local transfer stations. This project utilized the above mentioned education and outreach campaign for promotion. The project recycled 203.8 tons of material and raised the area's recycling rate by 20 percent. The revenues from the sale of recovered materials totaled $606. Although this did not seem like a significant amount of profit, it provided the realization that recycling can be profitable. PVVD has evaluated its options to increase the financial viability of this program. It was hoped that this program would continue to grow and that continued education would increase the amounts of material diverted.

Sierra Huachuca ARC, Inc.
"SHARC Recycling"
Mr. Mario Gonzales
120 North Sixth Street
Sierra Vista, AZ 85635
(520) 458-4611
Grant Award: $56,429

Proposal:
Sierra Huachuca Association of Retarded Citizens (SHARC) is a non-profit social service agency providing work for people with developmental disabilities. The agency had two recycling centers and provided jobs for 40 people to recover various quantities and qualities of paper, aluminum and steel cans throughout Cochise County. The agency proposed to increase the collected volume of recyclables to 15 percent and increase the processed product from their workshops to 20 percent over the grant period. The purchase of new equipment to replace and supplement existing equipment would allow the agency to accomplish the project goal.

Project:
Due to a delay in advance payment approval, this project began a few months behind schedule. Once payment was approved, SHARC purchased a forklift and a truck. In an effort to maximize resources, SHARC was able to locate two used balers for the price of one new baler. The agency approached the Arizona Recycling Program for approval of this purchase and, upon approval, added the second baler to its recycling operation scheduled to expand in Benson. Between the two sites, SHARC processed newspaper, old corrugated cardboard, sorted white ledger paper, aluminum and steel. This organization has been proactive throughout Cochise County and agreed to handle recycling for the city of Benson. This project was completed in October 1998.

Assessment:
This project was extremely successful in reaching and surpassing the goals that were presented in SHARC's proposal. SHARC used the equipment purchased through this grant to make the collection and processing of the recyclables more efficient and profitable. This occurred by increasing the amount of material processed per shipment to the end-user and increasing the amount of material that could be handled at their processing facility. At the time the contract ended, SHARC was able to collect and process 990 tons of materials. This was an increase of over 27 percent from the past year. SHARC projected a year-end total of 1,320 tons collected, which would be a 70 percent increase from the year before. SHARC was not only successful in its goal to increase collection, it successfully provided more training and job opportunities to people with developmental challenges.

3. The FY 1998 WRA Grants

The Arizona Recycling Program awarded $599,616 for the FY 1998 Waste Reduction Assistance (WRA) Grant. From the 55 submitted WRA proposals, 14 projects were awarded funding. The grant contract period began in March 1998, and ended in March 1999. The following is a brief description of the WRA Grant projects that were awarded funding. Assessments of the projects that were completed by June 30, 1999, or an update of activities for those projects that received extensions, is provided.

EnviroSand Inc.
"Buy EnviroMill Machine"
Mr. Dave Columb
P.O. Box 9519
Scottsdale, AZ 85252
(602) 273-7000
Grant Award: $75,000

Proposal:
EnviroSand (formerly, ACF Services) was a newly formed company designed to provide glass recycling services in the Phoenix metro area. The goal of this project was to purchase a glass processing machine and establish a customer/client relationship with public and private entities throughout metro Phoenix. Extensive background and marketing research had taken place over the last year to determine the feasibility of developing such a program in Arizona. Long term projections indicated that up to 40,000 tons of glass could be diverted each year from area landfills. At the time of the proposal, there were no in-state glass recycling operations. Therefore, EnviroSand would help serve the need for Arizona-based glass recyclers.

Project:
EnviroSand used the grant funds to purchase a glass processing plant capable of crushing all types of glass and screening the pulverized glass into multiple sizes of usable sand-like products. The city of Scottsdale assisted EnviroSand in establishing a location in the City. The goal of this project was to capture industrial and residential glass from the waste stream and to produce a variety of useful and desirable products that could be marketed inside and outside of the state. As well, EnviroSand tried to educate business leaders and citizens as to the importance of actively supporting recycling initiatives and making people aware of the many emerging applications for recycled glass products.

Assessment:
This project began on time with a great reception from the public and the city of Scottsdale. EnviroSand had their first sale of product, to a sand blasting company, in their first quarter of operation. It was found early in their operation that the milling equipment that they had originally purchased was not suitable for their needs. This caused a slight delay in their operations, so they later purchased a different custom-made mill. While this could have been an insurmountable obstacle, EnviroSand was able to continue their outreach efforts, and were even featured in a national recycling publication. Throughout the course of this project, EnviroSand worked with the manufacturer of their milling equipment to "de-bug" and fine tune their mill. All the while, they were able to accept, produce and market material in very limited quantities. Some of EnviroSand's marketing efforts included: 1) the launching of a Web site (www.envirosand.com), 2) participation in three publicly attended events totaling over 8700 attendees and 3) hosting Swedish representatives concerned with recycling glass. Additionally, EnviroSand reported diverting over 350 tons of glass and had processed and marketed 100 tons.

Arizona State University
"Technology of Crumb Rubber Composites"
Dr. Han Zhu
P.O. Box 871603
Tempe, AZ 85287-1603
(480) 965-2745
Grant Award: $29,891
Amended Award: $8,000
Total Award: $37,891

Proposal:
Waste tire disposal had long been a challenge in the state of Arizona with five to six million tires needing to be disposed of yearly. There were some applications in place that recycled the crumb rubber made from processed tires, such as rubberized asphalt and various types of garden equipment. This project focused on research and development of additional crumb rubber applications. Arizona State University would be doing various tests regarding its light weight, strength, non-catastrophic failure patterns and slow aging process. Potential impact of crumb rubber technology development would be regional, if not national.

Project:
This project had received an extension and an increase in funds. The extension was requested due to the necessity of obtaining twelve months of data on an experimental pour of Portland concrete mixed with crumb rubber and to continue the development of material and equipment associated with this project. The longer than normal extension period and increase in funds were approved to fund student assistance and to provide sufficient time for a four season analyses of the above mentioned concrete pour. This project had been very successful in developing many new and innovative uses for crumb rubber. These included crumb rubber amended Portland concrete and a spray-on crumb rubber based sound absorbing material designed mainly for application on highway sound barriers. This project was to be completed on December 31, 1999.

City of Williams
"Commercial & Residential Trash Containers/
Curbside Recycling"
Mr. Joe Duffy
113 South First Street
Williams, AZ 86046
(520) 635-4451
Grant Award: $57,135

Proposal:
The city of Williams proposed to implement a comprehensive curbside recycling program for its residents, as well as commercial vendors. At the time, there was no recycling program in place, but through a cooperative effort with the materials recovery facility (MRF) in Flagstaff, collection in Williams would be feasible and cost effective. Grant funding would be used for the purchase of the recycling bins necessary to get the curbside recycling project started. In addition, the documented success of such a program would be transferred to other rural communities throughout the state.

Project:

The city of Williams was able to purchase two hundred forty 300 gallon commercial containers and one thousand 90 gallon residential containers with the funds awarded through this grant. The City was fortunate to get a discounted rate for these bins due to buying them in conjunction with the city of Flagstaff's MRF project. The residential cans were distributed to each resident and curbside collection began in July 1998. The commercial containers were distributed to individual businesses after each owner met with the City's sanitation supervisor to discuss the needs of each business. The commercial program was started in October 1998.

Assessment:
This project was successfully completed. It was able to bring curbside commingled recycling to a community that had no available organized recycling opportunities. The City had a recycling rate of 6.9 percent. This number was expected to grow with increased business usage and further education of the Williams residents. As this program progressed, the amount of municipal waste diverted from the landfill would increase. The City identified the need to improve transportation of the material to the Flagstaff MRF and to expand its transfer stations capabilities to handle recyclables. This project was completed on time and on budget.

Maricopa Association of Governments
"Regional Recycling Information Exchange"
Ms. Drenan Dudley
302 North First Ave., Ste. 300
Phoenix, AZ 85003
(602) 452-5045
Grant Awards: $18,880

Proposal:
The Maricopa Association of Governments (MAG) is a council of governments that serves as the regional agency for the metropolitan Phoenix area. In addition, MAG has been designated by the governor to serve as the principal planning agency for the region in solid waste management. This project encompassed four goals. The first was to encourage an increase in the number and quality of recycling programs in the MAG region. Secondly, MAG planned on developing a Web site in order to improve the communication between public and private sectors on issues of recycling and its market development. The third goal was to update their Solid Waste Information Management System database and use this as a management tool. Lastly, MAG intended to develop a regional forum to facilitate joint action for diverting recyclables from the waste stream and create the opportunity to educate and inform jurisdictions on solid waste management and recycling issues. Because MAG had the authority and capability to coordinate such a project, the Arizona Recycling Program believed this would be a beneficial program for communities interested in expanding or beginning recycling programs.

Project:
MAG's project, to facilitate in the diversion of significant amounts of waste from the waste stream, was accomplished by completing a series of four goals. First, MAG increased the number and quality of recycling programs in its region. Second, a Web site was created to provide a link between the public, private and non-profit sectors on issues of recycling. Third, the Solid Waste Information Management Systems database was updated and used as a management tool. Finally, a regional forum was developed to facilitate discussion regarding recycling obstacles, successes and opportunities in its region.

Assessment:
This project resulted in a comprehensive program designed to divert significant amounts of material from the

solid waste stream. The four components were completed on time and on budget. The benefits of this project are expected to be great to the state and MAG region. The project presented recycling information in combination with the unique factors that affected the MAG jurisdictions. Two documents were developed that would be useful to the MAG member agencies and could be transferred to many similar jurisdictions. In addition, the Solid Waste Information Management Systems database and the Web site (www.mag.maricopa.gov/rrie/rrie.htm) were two tools that would provide opportunities for the MAG region to continue to find cost effective and efficient methods to divert materials from the waste stream. MAG held a meeting on March 16, 1999 to demonstrate the results of this project to its potential users.

Tucson Iron & Metal
"Paper and Plastic Recycling Program"
Mr. Doug Cohen
819 West 29th Street
Tucson, AZ 85713
(520) 884-1554
Grant Award: $75,000

Proposal:
Tucson Iron & Metal (TIM) primarily processes metals. After completing local research on the south side of Tucson, this company decided to expand their operation by accepting paper and plastic. The company planned to conduct local marketing, providing an economic incentive to the low income residents of southern Tucson to sell their recyclables. With this incentive for area residents, TIM' s program would prove cost effective for both the company and the community. ADEQ funding was used towards the purchase of a baler for this project.

Project:
TIM purchased a baler to increase the efficiency of their recycling efforts. They expanded the types of materials that they collected to include plastic, newspaper and cardboard. TIM ran advertisements/coupons in two local papers 1) offering four times the normal rate for these materials and 2) offering an extra penny per pound of aluminum cans if 100 pounds of plastic, newspaper and/or cardboard were brought in with the cans. In addition to accepting drop-off material, TIM placed bins at a plastics business and a landscape business to intercept the cardboard that these businesses generate.

Assessment:
This project was completed on time and on budget. TIM met many challenges during this project. The most significant and hardest to overcome was that research results provided inflated expectations. TIM conducted a survey of existing customers and then based their diversion projections on that survey. The anticipated amount of material to be diverted was 6,314 tons in the first year. In actuality, the participation level was not what the survey projected and there were only 40 tons of cardboard, 20 tons of newspaper and 20 tons of plastic diverted. Although the actual amount of material diverted did not measure up to the anticipated amount, TIM was able to increase the efficiency of their metal recycling efforts and diverted an additional 25 percent, or a total of 250 tons, per month. TIM pursued major generators of paper and plastic waste to increase the amount of material that would be processed. By increasing the amount of these materials that processed, they would receive a higher price for their material. They would then be able to pass these better prices on to their customers.

Tucson Habitat for Humanity
"Construction Closet"
Ms. Carole Baumgarten
P.O. Box 43235
Tucson, AZ 85733
(520) 326-1217
Grant Award: $50,000

Proposal:
Tucson Habitat for Humanity (THH) and TMM Family Services (formerly Tucson Metropolitan Ministries), both well-known, non-profit community-based organizations, teamed together in this project. These organizations constructed a warehouse for the storage of donated construction materials. The large volume of material, that had previously gone to landfills due to space constraints, would be stored on-site and used in the construction of homes for low-income residents. Because both organizations were well established in the Tucson area, the educational component and marketing of such a program would be easily attained.

Project:
THH was able to purchase a large building to house their "ReStore" business at a price that met their budget. The "ReStore" was a building materials and furnishings store that sold used or recovered materials to the public at extremely reduced rates. This project was delayed due to the availability of buildings that met THH's requirements. Near the end of the contract period, THH was able to find the perfect building in which to house this type of operation. THH leased the space next door to the "ReStore" for a permanent office. This project accumulated diversion data for the last quarter of this fiscal year. "ReStore" was visited by over 2,400 people and diverted over 144,000 pounds (72 tons) of material in this first quarter. At the request of the Arizona Recycling Program, this project was extended to September 1999 to provide more diversion data for the project's term.

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Santa Cruz County
"ABOP Recycling Station"
Mr. Victor Gabilondo
2150 North Congress Drive, Room 117
Nogales, AZ 85621
(520) 761-7800
Grant Award: $32,500

Proposal:
Santa Cruz County started a Household Hazardous Waste (HHW) Program in 1994, partnering with Pima County and three other southern counties to form a regional HHW Program in 1997. Through the success of outreach events, residents became more and more receptive to recycling HHW, but due to limited funding, initiating a separate program for Santa Cruz was not a possibility. With this WRA Grant, Santa Cruz County would construct a permanent collection facility for antifreeze, batteries, oil and paint processing, at the Rio Rico landfill, and would use that facility as a marketing and educational tool for the promotion of their program to all county residents.

Project:
This project has had numerous delays. The acquisition of land for this project took longer than expected and delayed the start of the project. With the Rio Rico landfill expansion, the plans for the location of the HHW facility changed; subsequently, delaying its construction. As well, the plan approval and engineering processes for the landfill expansion project have also delayed this project. The county requested and received a time extension to September 1999, from ADEQ .

Gila Ridge Pallet Company
"Pallet Waste Reduction"
Mr. Gary Pocock
P.O. Box 6481
Yuma, AZ 85366-6481
(520) 726-6256
Grant Award: $52,200

Proposal:
The owner of Gila Ridge Pallet Company has been in the pallet recycling business for over 14 years, with experience in pallet manufacturing dating back to 1971. Data show that pallet production is second only to the home construction industry in the use of wood, with 86 percent of broken pallets going to landfills. This Yuma-based operation recycled and repaired pallets manually and, with this proposal, planned to automate the process. This new process would increase the efficiency of pallet recycling with a potential of diverting more than 2,000 tons of wood waste from the landfill. All wood used in the repair process would be reclaimed from pallets beyond repair.

Project:
The grant funding provided for the purchase of automated equipment to increase efficiency and safety in the recycling and repair of wood pallets. The equipment improved the recycled pallets structural integrity and end-product quality, thus increased the marketability of the recycled product. This project also incorporated a means of educating the pallet industry as to the feasibility of using and making recycled pallets. This education component also increased the company' s ability to attract potential sources of used pallets for recycling.

Assessment:
Due to delays in the purchasing and installation of the equipment, this project was only operational for a quarter of the contract period. As a result of these delays, Gila Ridge Pallet Company was only able to report a diversion 100 tons of material. Worker safety and the efficiency of their recycling business increased as a result of this project. Gila Ridge Pallet Company had expressed that there is still work that needs to be done in getting pallet companies to participate in this project. It was the hope of the Arizona Recycling Program that this industry could be shown the advantages of recycling through the success of this project.

Terra Cycle Technologies
"Composting"
Ms. Jo Jean Elenes
1371 East Frontage Road
Rio Rico, AZ 85640
(520) 604-2089
Grant Award: $65,000

Proposal:
Terra Cycle Technologies, a newly formed company, planned to start an organic composting facility in Santa Cruz County. An area study showed that over 65 percent of waste going to the county landfill was compostable material. This statistic was 35 percent over the national average. Terra-Cycle planned on diverting not only produce, which accounted for a large volume of the compostable material mentioned above, but also the produce boxes and pallets that would otherwise be landfilled. The potential for waste diversion was approximately 20,000 tons of organic waste per year. This grant funding would be used toward the purchase of equipment and direct costs associated with starting up such a project.

Project:
This project paid for the lease of a back hoe with grapple, a forklift, a windrow turner and a tractor for a commercial composting operation. Printing and consultant fees were also funded through this grant. Terra Cycle was to provide an education component to this project to increase awareness in the community concerning recycling. Terra Cycle located its operation in Rio Rico, AZ and began excepting materials in the first quarter of operation. There were some unexpected difficulties that arose, providing real challenges to this project. One of the challenges was to gain access to materials. This was due to the location of their facility, the facilities infrastructure and the growing cycle of the feedstock materials. Second, the contamination that was encountered in the packaging was quite substantial, and caused an increase in the amount of time and expense needed to process the material.

Assessment:
Although the proposal estimated a diversion of 20,000 tons of organics, there were many obstacles that were unforseen at the start of this project, as stated above. Terra Cycle was only able to divert a total of 4,450 tons of material in this first year of operation. Terra Cycle made great strides in overcoming the obstacles they faced, and tried to establish a refined system of management to increase the amount of material diverted and the profitability of this project. The education that was provided was through the sponsorship of a regional satellite conference focused on the agricultural community and the use of compost in that industry.

River Cities Waste Systems, Inc.
"Boy Scouts Newspaper Drop-off Program"
Mr. Brian Conway
2000 West Acoma Boulevard
Lake Havasu City, AZ 86403
(520) 855-9441
Grant Award: $8,010

Proposal:

Prior to River Cities Waste' s (formerly Laidlaw) arrival to Lake Havasu City in 1990, the Boy Scouts of America (Boy Scouts) newspaper drop-off program was the only recycling outlet available to the citizens of Lake Havasu City. Over the last several years, various recycling organizations attempted to partner with the Boy Scouts and maintain this struggling collection program. The project proposal outlined the purchase of two drop-off containers and the funds necessary for River Cities Waste to haul the material for processing. The Boy Scouts would be paid to maintain the site with monies received from the sale of the baled newspaper. This new process would make it easier for area residents to participate, reduce contamination and increase efficiency.

Project:
The main component of this project was the purchase of two enclosed roll-off containers to serve as recycling drop-off sites. There were several articles written in the local newspaper about the project and there were signs posted at the drop-off sites and decals placed on the bins. The purchase of these containers improved the process of newspaper collection and provided a revenue source to fund future Boy Scout activities. This provided a greater opportunity for Lake Havasu City residents to recycle.

Assessment:
The goals of this project were met to expectation. There was a total of 65 tons of newspaper that were processed. There was no expected amount of material that this project would divert. The local Boy Scouts provided the upkeep of the bins and notified River Cities Waste of any need for service or pick-up. This partnership was expected to continue and would provide a revenue source for the Boy Scouts.

Pinal County Dept. of Solid Waste
"Expanded Mobile Recycling Project"
Ms. Barbara Parkin-McBride
P.O. Box 1747
Florence, AZ 85232
(520) 868-6680
Grant Award: $24,000

Proposal:
Pinal County operated a mobile recycling program whereby recyclables were picked up periodically and transported from the county' s many rural communities. The goal of this project was to purchase additional trailers in order to expand this operation. Pinal County planned on providing the opportunity to recycle for communities that were not served. In addition, the County would pick up the materials on a monthly, rather than quarterly, basis. With the amount of interest shown by area residents, Pinal County believed the expansion to be viable and necessary for the overall success of their recycling program.

Project:
The goal of this project was the expansion of their pilot mobile recycling program. The expansion provided a more timely and convenient service to the residents of rural Pinal County and improved opportunities for waste diversion. This grant, and additional funding from the County, allowed for the purchase of a van and three mobile recycling trailers to serve as drop-off sites in 12 communities on a regular set schedule.

Assessment:
This project proved to be a great success for Pinal County' s recycling program. With the increase in the number of mobile recycling units, the program was able to provide service for five days per month per site. With this

increase in the number of days at the collection site, the amount of materials collected over the first four months of this project, as compared to the first four months of the pilot project, increased almost 12 percent. The projected increase in diversion over the first 12 month period was 235 percent or up to 1165 cubic yards of material.

The Farm at South Mountain
"Compost Demonstration Site"
Ms. Diann Peart
6106 South 32nd Street
Phoenix, AZ 85040
(602) 965-3266
Grant Award: $15,000

Proposal:
The Farm at South Mountain (The Farm) operates an organic garden (including a pecan grove), a sandwich shop, a fine dining restaurant and a composting site in south Phoenix. This grant would allow The Farm to expand its current composting facilities, establish a compost demonstration site, do commercial marketing of their compost and develop a new brochure with a complete overview of the expanded project. Partial funding provided for a full-time compost coordinator and some direct costs associated with expanding the compost facility. The long term goal of The Farm was for this project to become self sustaining.

Project:
The Farm declined its grant award on September 5, 1998. This was due to structure changes within the organization. After evaluating the negotiated reduction in the amount of funding, The Farm realized that it would be unable to hire the proposed compost coordinator, and therefore could not successfully complete the project.

Friedman Recycling
"Arizona Small Business Recycling Project"
Mr. David Friedman
3640 West Lincoln Street
Phoenix, AZ 85009
(602) 269-9324
Grant Award: $39,000

Proposal:
Friedman Recycling, the oldest and largest independent paper recycling company in Arizona, conducted research on the small business community and its recycling efforts. They found that Arizona small businesses generated over 200 times more waste than Arizona big businesses. Friedman proposed to develop the Arizona Small Business Recycling Project. This project would offer no-cost, start up, recycling programs to small businesses who, without the assistance of the Arizona Small Business Recycling Project, would otherwise not be able to support a recycling program. The long term estimate was for a diversion rate of approximately 2,700 tons of material each year. Funding was requested for the purchase of recycling bins, which would be made available to businesses interested in participating. Extensive marketing and education were incorporated into this project.

Project:

Friedman Recycling requested and received a four month extension to their project. This extension allowed Friedman to expand the scope of this project to include drop-off points in Tucson. Friedman Recycling purchased 61 three cubic yard containers with funds from this grant. They have placed 21 bins in Tucson at the "Neighborhood Recycling Centers" and have 66 businesses participating in the Phoenix metro area. The project has diverted 259 tons of material to date. Friedman Recycling initially used an advertisement in the *Business Journal* and a cold-calling marketing strategy for there marketing and found that this did create a sufficient market demand. Friedman Recycling has addressed the low participation rate by devoting a full time marketing/education employee to this project. This project is scheduled to end on July 19, 1999.

Grower's Mulch, Inc.
"Maximum Diversion of Green Waste"
Mr. Neal Brooks
18047 North Tatum Blvd.
Phoenix, AZ 85032
(480) 992-5457
Grant Award: $58,000

Proposal:
Grower' s Mulch is a well established composting operation located in metropolitan Phoenix. The Grower' s Mulch president has been in the greenwaste industry for 23 years, and has realized the potential of greenwaste diversion, both economically and environmentally. Since 1996, Grower' s Mulch has diverted approximately 12,000 tons of greenwaste. Through marketing and research efforts, this company received long term commitments from several landscape related operations to have their greenwaste routed to Grower' s Mulch for composting rather than taking it to the local landfill. The projection was for an immediate diversion of 70,000 cubic yards of organic matter, which equates to 93,100 tons. Grower' s Mulch would receive funding for the purchase of roll-off containers needed to collect the large volumes of greenwaste at each of the landscape sites.

Project:
Through this grant, Grower' s Mulch purchased twenty-four, 40 cubic yard roll-off containers and placed them at commercial landscapers and tree farms to capture clean greenwaste from those sources. They would then use these containers to deliver the compost generated back to the source of the greenwaste. They have also accepted material that their customers have delivered to them. Grower' s Mulch used this high out-put potential to generate a market for their end product, which then drove their need for more feedstock.

Assessment:
Grower' s Mulch was able to divert a total of 68,760 cubic yards or 91,450.8 tons of material. Of this total, 19,160 cubic yards of greenwaste was directly brought to the facility by use of the roll-off containers. The bins were then utilized as a delivery container for the compost. Because end compost is more dense than the initial raw materials, these bins proved be very useful in the collection and delivery system used by this business. This was a very successful project and will continue to be a great benefit for the state for years to come. This project shows that self-sustaining markets are available to companies that are able to generate a quality product from these waste materials.

4. The FY 1999 WRA Grant

The FY 1999 WRA Grant was available to private businesses, non-profit organizations and governmental agencies existing within, or servicing areas within, Arizona. A total of $547,421.00 was awarded to 11 projects selected from 65 submitted proposals. The grant period began on January 11, 1999 and will conclude in January of the year 2000. Organizations awarded up to and including $25,000.00 were required to match a minimum of 20 percent of the total project cost. Proposals requesting over $25,000.00 were required to match a minimum of 35 percent of the total project cost. The maximum funding request was set a $75,000.00.

All eleven projects were still ongoing at the time of this report. The following is a brief synopsis of each proposal.

City of Bisbee
"Yard Waste Diversion Program"
Ray Sparkman
118 Arizona Street
Bisbee, AZ 85603
(520) 432-6000
Grant Award: $12,468

Proposal:
The city of Bisbee proposed to decrease the amount of yard waste in the waste stream by implementing a yard waste diversion program. The City would purchase a wood chipper to mulch the material. The resulting mulch would be offered back to the citizens of the town at no charge. The yard waste would be picked up free of charge in all areas of Bisbee on Wednesdays. The material would be brought to the City' s garage area where the street crew would operate the chipper to produce the mulch. It was estimated that the City would be able to divert 10 percent of its waste stream through implementation of this program.

Colorado River Indian Tribes
"Green Waste Composting"
Robert Jackson
Route 1, Box 23-B
Parker, AZ 85344
(520) 669-1301
Grant Award: $20,900

Proposal:
The Colorado River Indian Tribes proposed to purchase an FM225 Flail Pulverizer mulching machine to assist them in diverting from the landfill all the green waste that was delivered to the tribe' s two transfer stations. It was estimated that the project would divert five to six tons of green waste per day from the solid waste stream. Products of the mulching operation would be distributed to local business and community members. The implementation of this project represented the first phase of an overall source reduction program created to reach the tribe' s solid waste management goals.

E.L.F. Products LLC
Jerry Foley
2521 North Fairview
Tucson, AZ 85705
(520) 792-2448
Grant Award: $75,000

Proposal:
E.L.F. Products requested funding for the capital purchase of a Uni-shred model #55 shredder as a part of a system to manufacture shipping pallets using recycled plastics and cellulose fibers. The project had the potential to recycle 4,325 tons of HDPE and LDPE plastics, and 1,425 tons cellulose fiber. These materials would be used to manufacture 200,000 reusable plastic pallets per year, which would replace wooden pallets currently in use. The reusable plastic pallets would assist in keeping the equivalent of 4,000 tons of wood waste from entering the waste stream each year.

Gila County Solid Waste Department
"Chipping of Land Clearing Debris"
Sharon Radanovich
1400 East Ash Street
Globe, AZ 85501
(502) 425-8501
Grant Award: $33,703

Proposal:
Gila County was working to reduce the amount of land clearing debris entering its landfills. Grant funding was used to purchase a portable, high volume wood chipper and to offset operating and maintenance costs. Due to the accelerated development throughout the county, the amount of land clearing debris entering its landfills had grown too large for the county' s small chipper to handle. It was estimated that each year 4,156 tons of organic waste, representing 13 percent of the total waste stream, could be diverted and used as landscaping material or sold to wood waste recyclers. The program had the ability to extend the life of the county' s two landfills by two years.

LB International Incorporated
"Bio-Mass Fuel Source: "Eco-Log"
Jim Lehman
850 East Highway 89A
Fredonia, AZ 86022
(520) 643-6066
Grant Award: $75,000

Proposal:

LB International requested grant funding to purchase equipment and machinery for the production of environmentally friendly fireplace logs known as "Eco-Logs". The product line included a 2.5 pound "6-pack" of logs ideal for the camping market, a 5 pound log suitable as a cosmetic fireplace log, and a 10 pound log that could replace coal and cord wood for serious heating needs. Each product would be composed of waste paper and wood fiber derived from small diameter lumber and forest residue available as a result of the Forest Services thinning programs that promote forest health. The logs would also burn 55 percent cleaner than traditional fossil fuels with respect to smoke and carbon monoxide. When fully operational, production of the logs would recycle 3,000 tons of waste paper each year.

Southwest Public Recycling Association
"Proposal to Develop Commercial Glass Recycling Infrastructure in the Phoenix Area"
Nancy Howlett
P.O. Box 27210
Tucson, AZ 85726
(602) 264-7797
Grant Award: $33,200

Proposal:
The Southwest Public Recycling Association (SPRA) proposed to develop commercial glass recycling in the Phoenix area. The glass recycling project would target the hospitality industry, specifically, restaurants and bars. Working with Curbside Recycling, a local recyclable material hauler, SPRA would establish glass recycling in 30 bars and restaurants in the Phoenix area and collect an estimated 1,250 tons of glass for recycling. A successful bar and restaurant recycling program could stimulate similar programs throughout the state and help insure that Arizona retained its critical, local glass markets.

Tucson Roll-Offs and Recycling
Fred Brown
P.O. Box 17867
Tucson, AZ 85731
(520) 721-4884
Grant Award: $73,400

Proposal:
Tucson Roll-offs and Recycling requested funding to construct a sorting line for recyclable construction and demolition debris materials. The project would sort the material and reclaim aggregate, wood and drywall. The aggregate would be recycled to produce aggregate base, engineer fill, pipe fill, mortar sand, and gravel. The wood waste would produce animal bedding, mulches, soil conditioners, grass play cushion, fire logs, re-cut lumber and animal feed. The drywall would be recycled into soil amendments, cement additives and adobe stabilizers. The facility containing the sorting line would have the capacity to divert 25,000 tons of construction and demolition debris from Tucson area landfills each year.

Universal Entech, LLC
"Debris Screening System"
Daniel Musgrove
5501 North 7th Avenue, Suite 233
Phoenix, AZ 85013
(602) 944-0083
Grant Award: $75,000

Proposal:
Universal Entech requested funding for the purchase of a debris screening system that would be utilized in conjunction with their existing wood processing equipment. The debris screening system would provide additional processing capabilities, more recycling flexibility, and improved operating efficiencies. It would allow the company to sort out high grade dimensional lumber, cardboard and metals for recycling from the construction and demolition waste stream. Contaminants would also be removed from the remaining material to produce cleaner wood chips and mulch products. Universal Entech estimated it would process 10,000 cubic yards of material during the first year of the system' s operation.

Verde Valley Fire Chief's Association
"Household Hazardous Waste Collections"
William R. Loesche
827 North Main Street
Cottonwood, AZ 86326
(520) 282-6800
Grant Award: $25,000

Proposal:
The Verde Valley Fire Chief' s Association proposed to sponsor three household hazardous waste (HHW) collection events to be held in April of 1999. One event would be held in each of the following communities, the city of Sedona, the city of Cottonwood and the town of Camp Verde. Residents would be able to dispose of poisons, corrosives, reactives, oxidizers and flammables. These include batteries, auto fluids, mercury, pesticides, paint, cleaning agents, acids and hobby chemicals. Explosives, bio-hazardous and radioactive materials would be prohibited. It was estimated that 2,000 residents would participate in the collection events.

Waste Not Recycling Centers, Inc.
"Carpet Bailing Equipment"
David LaFountain
1702 South 19th Avenue
Phoenix, AZ 85009
(602) 252-7712
Grant Award: $48,750

Proposal:
Waste Not Recycling Centers proposed to purchase carpet bailing equipment to expand the recycling of carpet made from Nylon 6 and Nylon 6.6. At the time of the proposal, the company had a customer base of 100 floor covering companies in Phoenix, Mesa, Tempe and Chandler. During 1998, 750 tons of used carpet was collected and delivered to manufacturers of new carpet. The purchase of the bailer would allow them to increase the amount of carpet recycled to 4,500 tons per year and they would be able to offer their services to a larger customer base, including collecting carpet from landfills in the Phoenix metropolitan area.

Western Organics Incorporated
Doug Porter
P.O. Box 25406
Tempe, AZ 85282
(602) 966-4442
Grant Award: $75,000

Proposal:
Western Organics requested funding for purchase of CEC screening device to increase the company' s capacity to compost new sources of municipal green waste and municipal wood waste. Organic material from municipal sources were contaminated with much more rock and plastic materials than the organics the company had used in the past. In addition, municipal green waste contained palm branches which were more fibrous and took much longer to compost. The screening device would allow Western Organics to sort the incoming material and increase the its capacity in the Tucson and Phoenix by 40 percent, or 1,450,000 cubic yards over a five year period.

C. Waste Reduction Assistance Research and Development (R & D) Grant

The R & D grants were split from the main group of WRA proposals in the summer of 1998. This was done to help evaluate both types of grant proposals on a more equitable basis. The purpose of the Waste Reduction Research and Development Grant program was to develop tools and ideas that would to divert significant amounts of material from the solid waste stream in the future.

1. The FY 1999 WRA R&D Grant

The FY 1999 R & D Grant was available to private businesses, non-profit organizations and governmental agencies existing within, or servicing areas within Arizona. A total of $203,314.00 was awarded to 6 projects selected from 26 submitted proposals. The grant period began on January 11, 1999 and would conclude in January 2000. Each organization was required to match a minimum of 25 percent of the total project cost. The maximum funding request was set a $50,000.00.

All six projects were still ongoing at the time of this report. The following is a brief synopsis of each proposal.

Arizona State University
"Crumb Rubber Added Coating/Paint Materials"
Dr. Han Zhu
P.O. Box 871603
Tempe, AZ 85287-1603
(602) 965-0835
Grant Award: $22,984

Proposal:
This project would develop and design coating and paint materials that contain crumb rubber for a wide variety of applications and also a portable spray applicator. This would produce an end product that uses recycled crumb rubber from used tires and provide a value added product with many beneficial qualities.

Hortec Incorporated
"Reuse of Dairy Waste Water in the Composting of Wood and Green Waste"
Sharon R. Petterson
3401 East Baseline Road
Phoenix, AZ 85040
(602) 437-0700
Grant Award: $50,000

Proposal:
This project would create an economical, technologically advanced system for the diversion and treatment of dairy waste water. This waste water would be processed such that it would become a useable and beneficial additive to compost. Additionally, this project would reduce the amount of waste created in dairy operations and could reduce the amount of water needed at these duel production facilities.

Northern Arizona University
"Food Waste Composting Research Project"
Kathleen Leonardis
P.O. Box 4130
Flagstaff, AZ 86011
(520) 523-6709
Grant Award: $6,300

Proposal:
The university proposes to determine the feasibility of collecting and composting the food waste generated in their food service stations. This project would integrate other sources of green waste with this food waste to create a value added compost and serve as a model for other institutions and large generators of food waste.

Sonora Environmental Research Institute, Inc.
"A New Use for Mixed Glass Cullet"
Ann Marie A. Wolf
3202 East Grant Road
Tucson, AZ 85716
(520) 321-9488
Grant Award; $45,062

Proposal:
This project would prove the feasibility of using recycled mixed glass cullet as an alternative abrasive for industrial strength cleansers. This would provide a market for the mixed glass cullet that is produced in the state as well as a value added product that is more environmentally friendly.

Sonora Environmental Research Institute, Inc.
"Low Cost Sorter of Recyclable Materials"
Ann Marie A. Wolf
3202 East Grant Road
Tucson, AZ 85716
(520) 321-9488
Grant Award: $43,730

Proposal:
This project would develop a low cost prototypical optic sorter into a rigorous practical field unit and investigate the methods of mechanical separation of the identified items. This project would produce an affordable alternative to the common labor intensive separation methods used by most material recovery facilities.

Southwest Public Recycling Association
"Waste Characterization Studies for Selected Rural Communities"
Anne Weaver Lozon
P.O. Box 27210
Tucson, AZ 85726
(520) 791-4069
Grant Award: $35,238

Proposal:
This project would obtain information on the waste stream characteristics of rural communities in the state. The information that this project obtained would be invaluable to the state' s waste reduction efforts. It would allow local and state recycling coordinators to identify the amounts of recyclable materials that are part of their waste stream and to then focus their efforts on a best plan to reduce that waste.

D. Waste Reduction Initiative Through Education (WRITE) Grants

1. The FY 1998 WRITE Grant

The FY 1998 Waste Reduction Initiative Through Education (WRITE) Grant was available to governmental entities, private industry and non-profit organizations. The Arizona Recycling Program awarded a total of $222,485.50 for 12 recycling education projects. The grant period began in August 1997 with an ending date of August 1998. Some of the projects were given an extension to December 1998. Each project description includes a summary of the proposal, an account of the actual project activities and an assessment of the grant project. Grant funded resources that have resulted from these projects are available at the Arizona Recycling Program Office for review and/or duplication.

Agua Fria - New River Natural Resource Conservation District

Agua Fria-New River Natural Resource Conservation District
"The Earthworm Tunnel"
Ms. Kathy Killian
3150 North 35th Avenue Suite 7
Phoenix, AZ 85017
(602) 379-3058
Grant Award: $14,143

Proposal:
Agua Fria-New River Natural Resource Conservation District was awarded funding for the design and construction of "The Earthworm Tunnel," a demonstration project that would promote worm composting as a method of diverting household organic wastes and paper trash from landfills. The visiting school classes and general public would be able to walk through the tunnel to observe the soil profile and witness the earthworms decomposing the waste while the worms turn and aerate the soil.

Project:
The design and construction of the "The Earthworm Tunnel," located at Duncan Family Farms in Litchfield, was completed in early May 1998. The earthworm boxes, root viewing area, simulated soil wall, and a soil monolith were incorporated into the structure of the demonstration project to provide interactive viewing areas for the public. Signs were created to further educate and guide the public through the tunnel while they witnessed the earthworms decomposing the waste. Installation of the signage, artwork, earthworms and soil boxes were added at the very end of the project term. The construction schedule experienced a few delays due to a lack of volunteer help, but was completed on time. All project tasks were completed as they were originally described in the proposal.

Assessment:
As outlined in their final report, the project partners, including the Agua Fria-New River Natural Resource Conservation District, Duncan Family Farms, the Arizona Chapter of the Soil and Water Conservation Society and the Arizona Department of Environmental Quality contributed to the success of this project. In addition, all partners promoted the value of this demonstration project long after the grant project was completed. Various newsletters and newspaper articles promoting the "Earthworm Tunnel" have circulated throughout the state. Television crews have continued to contact Duncan Family Farms to highlight the worm composting project in addition to the other educational projects available at the site.

Duncan Family Farms had an excellent education program that focused on farming in Arizona with an emphasis on bridging the gap that exists between urban and rural life today. At the ribbon cutting ceremony, Duncan Family Farms expressed their gratitude in having the "Earthworm Tunnel" at their location. This demonstration project fit with their goals of teaching students and their families about the benefits of composting organic matter on a large scale farm as well as in a small backyard worm bin.

Since the grant project had been completed, over 21,000 students have toured the Tunnel. The curriculum packets that the Duncan Family Farms developed included lesson plans and "how to" guides for building a worm compost bin. Elementary school teachers are provided curriculum packets for future use in their classrooms.

Arizona Clean & Beautiful
"Recycling Education in Rural Communities"
Ms. Leandra Lewis
1645 East Missouri, Suite 230
Phoenix, AZ 85016
(602) 274-0494
Grant Award: $11,537

Proposal:
Arizona Clean & Beautiful (AC&B) was awarded funding to develop a comprehensive educational project that would serve as a model to increase recycling through the active participation of a diverse core community group. The recycling education project was proposed for implementation in two rural communities. The model would be designed to include meetings with civic leaders, an evening program for the parent-teacher organization, site visits to recycling locations, a workshop for teachers and additional activities.

Project:
The Recycling Education in Rural Communities (RERC) program was developed from the assessment of current recycling education activities in the communities of Kingman and the Navajo Nation, specifically Sanders. Guest speakers from local environmental industries disseminated information about their company's environmental practices. Field trips were tailored to increase the attendees knowledge about available local recycling resources and the area's environmental concerns. The community leaders were also given an overview of an environmental education curriculum developed by Keep America Beautiful, titled "Waste in Place".

The Kingman workshop, held February 19-21, 1998, was implemented to include a community leadership luncheon and educators' workshop. Representatives from local recycling facilities assisted in the dissemination of information regarding the economics of recycling and the identification of local key contacts and resources. Key contacts included the affiliate of AC&B, the Kingman Clean City Commission, municipal representatives from northwestern Arizona and local private companies in the recycling industry. Presentations were made by the Kingman Recycling Center, North Star Steel and USA Waste. The attendees indicated that they made valuable contacts at the Leadership luncheon and were informed of their local recycling resources for education and economics. In reviewing the results of the Kingman RERC, several recommendations were made to increase the success of the second rural community RERC.

The Sanders workshop was held from July 23-26, 1998, with a modified format to address the local area's solid

waste concerns. The Nahata Dzill Environmental Service and representatives from Apache County, St. Johns, Holbrook and Navajo Nation EPA were present. Following the recommendation to identify unique aspects of the community, the Nahata Dzill affiliate decided to implement an education program for the proper disposal of solid waste and later incorporate a recycling program into their solid waste program. Due to the long distance between communities, local recycling contacts were established for the regional area.

Assessment:
The goal of the RERC was to engage in active participation from a diverse group of community members. AC&B set three objectives for the project: 1) to increase the awareness of local recycling efforts and the knowledge of the recycling process, 2) to provide information on the economics of recycling and 3) to identify local key contacts and resources connected with recycling. AC&B, with the assistance of their affiliates, completed the objectives of the project' s goal.

AC&B worked cooperatively with their affiliates to coordinate the two workshops. The RERC workshops were modified to fit the needs of the local community and were also adjusted for the level of participation. The local affiliates highlighted their grassroots recycling programs and discussed the resources needed to improve their commitment to reducing solid waste. A survey was conducted to determine the attendees' understanding of the workshop information and their commitment to future recycling efforts. The attendees indicated that they made valuable contacts at the leadership luncheon and were informed of their local resources for recycling education and recycling opportunities.

Arizona Clean & Beautiful
"Influence Behavior Public Service Announcements"
Ms. Leandra Lewis
1645 East Missouri, Suite S-230
Phoenix, AZ 85016
(602) 274-0494
Grant Award: $39,700

Proposal:
In cooperation with Dr. Cialdini and a selected Arizona State University (ASU) research team, Arizona Clean & Beautiful (AC&B) proposed to set up a recycling advertising campaign for radio and television to be aired in designated Arizona rural communities. The grant funding would enable the research team to investigate the norms that influence one' s decision to recycle. Prior to launching this recycling education campaign, the research team will study the persuasive influences that are critical to public education in rural Arizona. The Arizona Public Service Company (APS) planned to provide professional and technical support to produce the public service announcements. Distribution would be conducted by AC&B and participating affiliates.

Project:
The ASU research team surveyed the AC&B affiliates and recycling facility managers in the designated communities to gather the information needed for this grant project. By reviewing and researching the disciplines

of social psychology and the persuasive appeal of mass media communication, the ASU research team developed the media campaign specifically to increase Arizona's efforts to recycle. "Findings from an ASU litter study indicate that people are more likely to respond to messages urging non-littering and recycling habits if they are verbal, positive and instructional."[1] As part of the project, the radio and television scripts were written to incorporate this psychology to influence human behavior. With the assistance from ASU drama students volunteering their acting skills, APS produced three television and three radio public service advertisements (PSAs). During the scheduling of the media timeline, it was determined that the April through June 1998 time period was too saturated with other environmental media campaigns to get a true analysis of the effect that this campaign would have on Arizona citizens. Therefore, the grant project's timeline was revised to air the campaign in August 1998. A six-month extension was requested and approved by ADEQ for the implementation of the new PSA campaign schedule.

From August through November 1998, recycling data was collected from the following cities: Yuma, Flagstaff, Prescott, Tucson, Phoenix and Snowflake. The PSAs were delivered to the appropriate radio and television stations in Yuma, Flagstaff, Prescott and Tucson. The cities of Snowflake and Phoenix did not receive the PSAs, but were used as control cities to monitor audiences unexposed to the PSA campaign. AC&B was unable to gather documentation to confirm when the PSAs aired in most of the selected cities. Data from Flagstaff radio stations was provided and included in the final analysis.

Assessment:
Based on the research of the ASU research team, informational campaigns often depicted a large number of individuals engaging in an undesirable behavior and discourage audience members from engaging in this behavior.[2] Therefore, the radio and television PSAs were produced with a humorous appeal that represented recycling as a frequent behavior of most Arizonans.

Due to the lack of data regarding the exact dates, times and frequencies that the PSAs aired, the ASU research team based their analysis on the delivery dates of the PSAs and then evaluated the recycling data presented by the recycling facilities. In all four cities, the ASU research team indicated that recycling activities were positively affected by the PSA campaign. When evaluating the two control cities, ASU indicated that the recycling activity declined or remained unaffected. The ASU research team did take into consideration the recycling education programs that were being implemented by Flagstaff and Tucson and were able to draw conclusions that the PSAs did provide a recycling advantage to the four rural communities.

This grant project did prove to be successful in developing high-quality PSAs with a more positive approach for informational advertising. In fact, the "Arizona Recycles - Cowboys" television PSA was awarded a 1998 Award of Merit by the Arizona Chapter of the International Television Association, the largest and most prestigious organization for corporate video in the world. An in-depth final report, outlining the findings and conclusions of the human behavior-based PSA campaign, can be found at the Arizona Recycling Program Office. A funding balance of $5,426.38 was not provided to AC&B and was returned to the Recycling Fund for future use.

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[1] 1998 Litter & Recycling Behavioral Study, Arizona State University.

[2] Ibid.

Arizona Hotel/Motel Association
"Waste Reduction Education Campaign
for the Hospitality Industry"
Mr. Paul Hayes
7500 East Double Tree
Scottsdale, AZ 85258
(602) 991-3388 ext. 5312
Grant Award: $19,300

Proposal:
The Arizona Hotel/Motel Association (AHMA) is a trade association representing over 560 hotels, motels and hospitality industry suppliers throughout Arizona. The AHMA was awarded funding to develop and implement a waste reduction education campaign targeted at Arizona's hospitality industry. The three components of the Association's project were to include the following: 1) the Waste Reduction Guidebook, that would provide complete information on how to set-up, operate and maintain a successful hotel and motel waste reduction and recycling program, 2) *The Good Earthkeeping Journal* which would focus one of four quarterly publications on solid waste reduction and 3) the workshop that would be held to highlight speakers representing Arizona motels and hotels who have implemented waste reduction programs.

Project:
The AHMA involved their Environmental Committee members to assist the subcontractor, the Southwest Public Recycling Association, in completing the goals of the grant project. In April 1998, the source reduction issue of *The Good Earthkeeping Journal* was completed and distributed to 1300 hotels to promote solid waste awareness and the Waste Reduction Workshop.

On June 1, 1998, the Waste Reduction Workshop was held in conjunction with the Annual AHMA Conference in Tucson, Arizona. The project manager facilitated the waste reduction workshop and included the following components: waste auditing, employee training and buying recycled products. A visual multi-media presentation was provided to engage the audience with the workshop information. The guidebook titled, "Inn keeping with the Environment - A Waste Reduction Guidebook for the Arizona Lodging Industry," was designed as a comprehensive tool that contained basic information on waste reduction and recycling and included resources and contact information for future reference.

In distributing the guidebooks, it was determined that mailing the documents would be less effective than directly delivering the waste reduction message in person. Therefore, AHMA requested and was approved for an extension to the end of December 1998, to distribute the guidebooks at meetings and presentations. The project manager and committee members traveled throughout Arizona to distribute the guidebooks at the regularly scheduled "Inn-keeper" meetings. These meetings, along with other outreach events, were utilized during the remaining portion of the grant project to complete the distribution.

Assessment:
The AHMA successfully promoted the Waste Reduction Workshop through *The Good Earthkeeping Journal* and through industry related publications. The committee's decision to have the workshop at the Annual AHMA Conference increased the participation level and the amount of attention given to the workshop. Governor Jane Dee Hull was a guest speaker at the conference. Workshop attendees were able to hear Arizona-based case studies of waste reduction programs and were given the opportunity to have experts address their

concerns when establishing similar programs.

The guidebooks have proven to be a very useful resource for a variety of institutional-type recycling programs including grade schools, universities and apartment housing. Many positive comments were received in regard to its "user-friendly" format. Awareness of the project was elevated to the national level through a presentation at the National Recycling Coalition Congress in Albuquerque, New Mexico. The final guide and supplemental tools were also presented to representatives of corporate hotel chains, belonging to the Environmental and Engineering Committee of the American Hotel and Motel Association in Orlando, Florida. The guidebook was given an Award of Merit in the Public Media category of the 18th Annual Environmental Excellence Awards presented by Valley Forward Association in September 1998.

AZRC/ Organic Products Committee
"Annual Compost Workshop/Equipment Demonstration"
Mr. Daniel Musgrove
P.O. Box 2533
Phoenix, AZ 85002
(602) 944-0083
Grant Award: $7,000

Proposal:
The Organic Products Committee (OPC) was awarded grant funding to coordinate a workshop entitled "Composting ...Southwest Style." The workshop proposed to promote the benefits of composting to the state's agricultural industry, potentially the largest user of compost. A guidebook would also be developed as a result of the grant funding for attendees of the workshop to use as a future resource.

Project:
At the beginning of the project's timeline, OPC set up planning meetings to assign the project tasks to small subcommittees. Assignments included the guidebook's layout and design, public notification of the workshop and administration of the project. The promotion of the workshop included a combination of postcard and brochure mailings utilizing the Arizona Recycling Program's mailing list, combined with the Arizona Recycling Coalition's (AzRC) mailing list. The hotel arrangements were secured in the first phase of the project's timeline. The guidebook was designed to incorporate the speakers at the workshop, vendor attendance information and resource listings of equipment companies and technical assistance groups.

The two-day workshop was held at the Holiday Inn Select on April 20-21, 1998, and included technical seminars and informational presentations. The conference was followed by an equipment demonstration, "The War of the Machines," that took place at the Salt River Landfill. An exhibit hall was designed for industry vendors to present their services, products and messages to the attendees.

ADEQ's Director welcomed the conference attendees and encouraged composting efforts throughout Arizona. The workshop covered various topics ranging from home composting to the regulatory status of composting facilities and organic labeling. There were approximately 130 attendees, including speakers, vendors, planning group members and AzRC/OPC board members at the conference. OPC distributed the "Compost Resource

Guidebook" to all attendees at the time of registration along with the agenda packets. The guidebooks are available through the OPC and the Arizona Recycling Program.

Assessment:
The workshop provided a forum for interested municipalities, counties, private businesses, non-profit organizations and citizens throughout Arizona and the southwestern states to gather information on effective methods for recovering, recycling and composting organic waste. The conference increased Arizona's agricultural community's desire to continue communication among their peer groups. As mentioned earlier, OPC assigned the project tasks to various members of the committee to utilize the members' skills and to expedite the project. Although this style of project management is effective for some projects, it made it difficult to monitor the contents of the guidebook and the status of the overall project.

Cottonwood-Verde Valley Recycles
"Educational and Informational Outreach on Recycling and Waste Reduction to Residents, Schools and Businesses of the Verde Valley"
Ms. Joan Bourque
P.O. Box 1535
Clarkdale, AZ 86326
(520) 634-6606
Grant Award: $25,000

Proposal:
Cottonwood-Verde Valley Recycles (CVVR) was awarded a grant to coordinate a recycling education project for the residents, businesses and schools of the Verde Valley area. The five elements of the grant project would include: 1) creating a curriculum and slide show for local schools, 2) staging a school play, 3) hosting one free business workshop, 4) creating weekly and monthly newspaper columns and 5) producing associated public service announcements for the radio.

Project:
CVVR created a schedule for presenting the slide shows throughout the grant project while preparing for the theater project and business workshop to be implemented at a later date. Newspaper editorial columns and radio public service advertisements promoted the various recycling project events throughout the term of the project to provide continuity.

An eight-page, grade-specific curriculum was used during the slide shows including a "Fairy Mulch Mother" character to entertain students. The presentations were given to extremely large audiences of elementary students, but a high level of interaction was still maintained. To involve the older students, a high school contest was set up for competing schools to gather the most recyclables in the Verde Valley for a chance to win a school dance. The curriculum was provided to all the schools at the time of the school presentations.

A total of 14 slide shows were conducted at seven different schools in the Verde Valley, and an additional presentation was given at the Sedona Recycles Board Meeting. Many members of the Sedona Recycles Board requested slide shows for the following school year.

On April 3, 1998, the business workshop, held in Cottonwood, included a luncheon presentation on current recycling efforts and a discussion of how community involvement could sustain recycling after the grant project ended. The business seminar was also used as a forum for setting up a coalition of businesses that purchase recycled office supplies and products. Approximately 50 people were in attendance including: Cottonwood's mayor, a council member from the city of Clarkdale and representatives from the several municipal offices.

The theater project drew an audience of over 300 parents, teachers and community members in Cornville, on April 4, 1998. The participating students created the story line and characters with the assistance of the grant project's leaders. The costumes and stage props were all made from recycled material.

The slide shows, newspaper columns and radio announcements continued throughout the duration of the project. Handouts were designed to assist school teachers, residents and businesses with recycling education. Flyers were posted throughout the local area to strengthen the awareness of local recycling opportunities.

Assessment:
The communities of Cottonwood, Camp Verde, Cornville, Bridgeport, Jerome and Clarkdale benefitted from this uniquely executed recycling education program. The local newspapers and radio stations supported the program through additional promotion that they contributed to the project. All of the grant project's tasks were successfully completed and each event followed the original budget estimates outlined in the proposal. The grant project managers indicated that their success was based on the initial communication with teachers, school principals and members of the community that included discussions for designing and implemented the valley-wide recycling education campaign prior to the design. All of the grant's recycling education tools are available at the Arizona Recycling Program office.

Gila County Solid Waste Department
"Gila County Recycling Grant"
Ms. Sharon Radanovich
1400 East Ash Street
Globe, AZ 85501
(520) 425-3231 ext. 316
Grant Award: $3,340.50

Proposal:
Gila County was awarded funding to utilize a high school group, called Global Awareness Prevention (GAP), as peer educators to travel around the county educating students about recycling and how a landfill is operated. The presentations given by GAP would include information regarding local recycling efforts, proper disposal of hazardous waste and the penalties for illegal dumping.

Project:
The project was implemented for the 1997-98 academic year. The peer educators included four groups of motivated students ranging in age from 15-18 years. The GAP students attended a "Train the Trainer" workshop to enhance their speaking and presentation skills used during the grant project. The presentations also included a slide show of how trash is collected and transported for placement in a landfill. The recycling programs that are offered at the Russell Gulch Landfill such as the recycling of car batteries, used oil, trees, tires and scrap metal were also included in the landfill descriptions.

Detailed information on how products can be recycled into new products were offered. The grant project focused on the major population areas of Payson, San Carlos, Globe and Miami.

Assessment:
The GAP recycling project allowed for approximately 6,000 students to view the landfill disposal operations and recycling education presentations. A handout was also developed and printed with local recycling information for future reference and for parents to utilize. The Gila County project manager noticed more involvement from the kindergarten through sixth grade students, who seemed to enjoy the recycling presentations much more. The Gila County project manager found it difficult to schedule presentations in the Payson and Globe area schools, due to the lack of interest from the school principals. After repeated phone calls and support gained from the publicity in the local newspapers, presentations were scheduled in these towns to finish up the grant project.

Town of Gilbert
"Recycling Education Pilot Program"
Ms. Christine Roush
525 North Lindsay
Gilbert, AZ 85234
(602) 503-6422
Grant Award: $2,202

Proposal:
The town of Gilbert was awarded grant funding to establish a pilot recycling education program geared toward children at the preschool and elementary level. The town of Gilbert proposed to design an animated coloring book that would provide local recycling information. The coloring books would provide a visual aide and reference the pilot project. The recycling information contained in the coloring book would also help to teach children why it is important to recycle, what materials are recyclable and how the children can do their part to help the environment.

Project:
The project manager developed a list of the local preschools and elementary schools in Gilbert. Gilbert corresponded with the schools by explaining the Town's established recycling program and the current education project. The Town explained that while the coloring book was being developed, presentations would be scheduled in the near future.

The first stage of creating the coloring book, involved the writing of the story line. "Debris Marie," the Town's recycling mascot, who entertains as well as teaches children about recycling, was incorporated into the story line. The coloring book went through several changes causing a delay in the completion of the layout and design work. In addition, the assigned project manager accepted a different job with the Town, but continued to oversee the grant project. The coloring books were printed later than the scheduled timeline. This delay influenced the presentation schedule for the preschools and elementary schools during the 1998 school year.

With the academic year at a close, the Town requested an extension of the grant contract period. As an alternative, the Arizona Recycling Program recommended that presentations be made during the summer months

at local recreation facilities and day care centers. The Town proceeded to conduct the presentations at the recommended locations with help from Debris Marie, in an effort to continue the program and keep the grant project on track.

Unfortunately, the Town was unable to conduct the required number of presentations prior to the end of the project. Therefore, the Arizona Recycling Program extended the project term to December 1998.

Assessment:
The Town experienced many set backs, including personnel changes that were made at three different times during the project' s schedule. Despite these challenges, over 3,500 elementary students were given a recycling presentation specifically for the Gilbert community. The coloring book contained a cartoon-type illustration that emphasized the benefits of waste reduction and recycling. Gilbert' s mascot, Debris Marie, attended the school presentations and was also written into the coloring book for future recognition.

During the summer break, the Town decided to re-group and submit another letter to the schools to ascertain their commitment in allowing the Town to make presentations. The schools worked the presentations into their curriculum schedules during the months of November and December 1998. Photos of the school presentations and copies of the coloring book were provided in the final report.

City of Tucson,
Solid Waste Management Department
"' Ravin' About Recycling!' Campaign"
Mr. Don Gibson
P.O. Box 27210
Tucson, AZ 85726-7210
(520) 791-3175
Grant Award: $51,385

Proposal:
The city of Tucson was awarded funding to coordinate a recycling education campaign, titled "Ravin' About Recycling!" The recycling education campaign was to include the following outreach methods: media, brochures, information sheets, technical assistance, workshops, presentations and the introduction of the "Recycling Raven" mascot. The coordination efforts would also to include the grant funded position of an intern to assist the City' s waste reduction education coordinator. The targeted audiences benefiting from the campaign would include: Tucson' s curbside recycling population, and residents not eligible for the curbside program, but who can participate in the City' s drop-off program, including: public housing residents, small businesses and various community groups.

Project:
The city of Tucson hired and trained an intern to assist the project manager with coordinating the activities of the grant project. The recycling bins were purchased and distributed to local businesses throughout the community. The Master Recyclers Program enlisted and trained a corps of volunteers to educate the community about the local recycling activities now available. The campaign' s literature was designed to include versions in English and Spanish. Curbside recycling information, small business packets, posters and multi-family housing

packets were compiled and distributed at various events throughout the city.

Rupert, the Recycling Raven mascot, was featured in several outreach events throughout the Tucson area as a recognizable symbol of the recycling education campaign. The media campaign was promoted by a local television station utilizing their own newscasters and donated air time to increase awareness of the recycling drop-off sites called "neighborhood recycling centers." The drop-off sites were available to residents that were not eligible for the curbside program and those living in apartment complexes. The neighborhood recycling centers also provided a drop-off location for white paper recycling that was emphasized in the small business recycling program.

Assessment:
The recycling education campaign was extremely successful in creating awareness of the newly-implemented recycling program. The goals that were set for achieving high numbers of outreach activities were surpassed. The project manager took every opportunity to utilize civic organizations, senior citizen groups, apartment resident councils, municipal departments, neighborhood associations, youth presentations and community events, to further the awareness of waste reduction programs available through the City.

The City worked in partnership with the local newspapers and existing resources to provide printed material to the public. A new publication, *Ravin' About Recycling Times*, was also produced as part of the campaign to provide curbside recycling schedules. Approximately 130,000, copies were distributed, with Spanish versions available to Tucson residents. Bus benches were incorporated into the campaign to give the messages high visibility.

In recruiting small businesses for waste reduction programs, the City staff provided information on identifying recyclable waste streams, outlining options for recycling and referring the business to commercial haulers when appropriate. Businesses were then recognized for implementing their programs by receiving a certificate of excellence in waste reduction.

The training guidebook that was designed for the Master Recyclers program and examples of the campaign's promotional products and publications are available for review at the Arizona Recycling Program office.

Tucson Clean & Beautiful
"Tucson/Pima County Waste Reduction Education Display and Brochures"
Ms. Joan Lionetti
P.O. Box 27210
Tucson, AZ 85726-7210
(520) 791-3109
Grant Award: $8,050

Proposal:
Tucson Clean & Beautiful (TC&B) was awarded a grant to incorporate and consolidate information from the various Tucson/Pima County environmental and solid waste offices. The proposed display and brochures were to provide a single base of comprehensive information on waste reduction and waste management education to the public. By working together, the various Tucson/Pima County offices would ensure that the display

would offer accurate and uniform education material. The display would be made of recycled materials and would be stored at the TC&B office where the staff would coordinate the scheduling of events and the use of the display.

Project:
The display' s layout and design was discussed in several meetings involving the five Tucson and Pima County jurisdictional offices, and in April 1998, TC&B utilized the completed display for Earth Day outreach events. The contracted agency built the display from recycled board material, as the grant outlined, and used remnant material to cover the display. Tucson Clean & Beautiful indicated that the finished display was not attractive or durable and it was hard to handle. TC&B and other participating organizations expressed their concern that the display was not structurally sound enough for the continual transporting and multi-use functions for which the display was originally designed to withstand. The advertising firm was asked to redesign the display to meet the needs of the grant project. After the committee discussed their options for the display, the contracted agency ordered a professionally made table-top display. An accompanying brochure was created to include the information on the display and to provide references for recycling information.

Assessment:
This grant project' s timeline was originally scheduled to end in May 1998, but due to the delay in reconstruction, the project' s timeline was revised for completion in August 1998. In addition to the changes that were made with the display, Tucson Clean & Beautiful indicated that working with the different government agencies created a challenge in achieving a unified waste reduction message for which all agencies could agree. Therefore, the task of writing a brochure as a group also proved to be difficult, but all agencies were happy with the final product. Photos of the re-designed display board and copies of the brochure were submitted with the final report.

Southwest Public Recycling
Association"Technical Assistance to Rural
Arizona Communities"
Ms. Nancy Howlett
P.O. Box 27210
Tucson, AZ 85726-7210
(520) 791-4069
Grant Award: $28,018

Proposal:
The Southwest Public Recycling Association (SPRA) was awarded funding to provide technical assistance to rural communities. SPRA planned to focus on increasing the recycling rate in Arizona by providing community officials, private recycling businesses and non-profit recyclers with in-depth information on their various recycling options. Direct technical assistance would be provided for rural Arizona communities and would place major emphasis on: 1) creating awareness to increase participation in recycling efforts, 2) developing efficient and flexible collection and processing systems, and 3) maintaining an effective marketing and transportation program.

Project:
For tracking purposes, the project manager created a schedule in which 24 communities would be provided assistance throughout the project term. At the beginning of the grant project, SPRA met with ADEQ to identify communities that were in need of technical assistance. These initial projects were determined through past inquiries from the selected communities and/or their lack of involvement in recycling activities. SPRA's quarterly reports described the technical assistance they provided each community by including the community name, contact names and concerns of solid waste disposal and/or recycling options. In addition, SPRA included their recommendations on how to increase the recycling efforts and/or how to initiate a recycling program.

Assessment:
Site visits from the Arizona Recycling Program and phone discussions with various jurisdictions confirmed that the technical assistance offered through the grant project addressed their concerns and requests for information. The technical assistance offered by this grant project exceeded the number of communities for which the project was originally designed to assist, with a total number of 35.

In their final report, SPRA indicated that the rural communities that were provided technical assistance were diverse and therefore faced varying challenges. However, SPRA also indicated that the general needs of these communities, when developing and maintaining a recycling program, were universal. Therefore, SPRA developed three lists of recommendations that included the following: 1) elements that successful rural recycling programs have in place, 2) challenges faced by rural communities when developing recycling programs, and 3) the technical and financial needs of rural recyclers. SPRA determined that the issues of leadership, community support and political support would continue to serve as crucial components to a successful program or could serve as major obstacles to implementing and maintaining a recycling program.

2. The FY 1999 WRITE Grant

The FY 1999 Waste Reduction Initiative Through Education (WRITE) Grant was available to governmental entities, private industry and non-profit organizations. The Arizona Recycling Program awarded a total of $258,723 to nine recycling education projects. The grant period was July 1998 through August 1999. Each project description includes a summary of the proposal and an account of the actual project activities up to June 30, 1999. An assessment of these grant projects would be provided in the FY 1999-2000 Arizona Recycling Program Annual Report.

Southwest Public Recycling Association
"Household Hazardous Waste Education Brochure"
Ms. Nancy Howlett
P.O. Box 27210
Tucson, AZ 85726
(520) 791-4069
Grant Award: $14,000

Proposal:

Often times, when people are relocating their household, they do not consider the proper disposal of their household hazardous wastes. The Southwest Public Recycling Association (SPRA) proposed to compile and distribute an educational brochure that would provide information and direction for the appropriate actions to take. Approximately 100,000 brochures were to be produced to target people who are moving into and out of their homes in Maricopa and Pima Counties. SPRA planned to work with the jurisdictions within Maricopa and Pima Counties, the Arizona Association of Realtors and selected commercial moving van companies to distribute the brochures and implement a consistent message of the proper disposal of household hazardous wastes.

Project:
By working with the recycling coordinators, household hazardous waste inspectors and representatives of the Arizona Association of Realtors, a technical review committee was formed. Meetings were held during the first and second quarters of the project to review household hazardous waste information contained in other brochures. The actual brochure was based on a brochure developed by the state of Indiana. The artwork and overall format was adopted by all of the participating communities. The committee decided to delay printing until the new area codes in the Valley were established. This caused a slight delay in the printing timeline, because the new area codes were not announced until March 1999.

One hundred thousand brochures were printed on paper made with at least ten percent recycled content. The printing costs were slightly less than what was originally budgeted. Therefore, the remaining funds were used to duplicate the negatives for all of the communities to use at any time in the future. This will allow for the project partners, including the Arizona Association of Realtors, the Arizona Recycling Program and all of the participating communities to reproduce the artwork with their own wording or with the original wording.

The distribution of the brochure was handled through the Arizona Association of Realtors, due to their involvement with people moving in and out of their homes. The Association advertised the availability of brochures in their monthly newsletter, at monthly regional meetings and by word of mouth. After completing the project, the project partners will be asked to evaluate their method of disseminating the brochures and their responses to questions regarding the brochures.

Tuba City Family Wellness Center
"The Protective Circle Project"
Ms. Fran Kosick
P.O. Box 1488
Tuba City, AZ 86045
(520) 283-2932
Grant Award: $ 13,690

Proposal:
With the new solid waste management system operated by the Coconino County Public Works Department, the western Navajo Nation has access to transfer stations for refuse and recycling opportunities. The six Navajo Nation communities with transfer stations in Coconino County are as follows: Tuba City, Cameron, Leupp, The Gap, Kayenta and Tonalea. The solid waste disposal fees that are currently being paid to Coconino County by the residents of western Navajo Nation have enabled the Tuba City Wellness Center to apply for this recycling

grant. Therefore, the Tuba City Wellness Center, a nonprofit education organization, proposed to educate the residents with a strong message, integrated from within the culture, to change prevailing attitudes toward waste disposal in this region. The education project would encompass a diverse number of elements that include informing the public about the new transfer station system, the impacts of illegal dumping, waste reduction and the production of recycling curricula for both the Navajo and Hopi Nations. Various recycling education tools would be developed as a reminder of the new services being offered by the County and the Tribe.

Project:
In order for this project to be effective, it was necessary for the Tuba City Family Wellness Center to coordinate the project' s tasks between the city of Flagstaff, the western Navajo Nation and Coconino County. A Waste Reduction Advisory Committee was formed to provide oversight and to assist the Tuba City Wellness Center with the project.

In the first and second quarter of the "Protective Circle Project," the focus was on the contest promotion to develop the Native American recycling logo and theme. The Tuba City Wellness Center conducted a Navajo language theme and logo contest that involved K-12 students from 12 schools. The selected logo and theme was later used on the magnets, brochures and the transfer station signs to provide a recognizable image for the "Protective Circle Project." Grand opening events took place at the transfer stations to signify the importance of their existence to the area. The "Protective Circle Project" also took advantage of advertising the new recycling opportunities by placing signs at the transfer stations. Brochures provided detailed descriptions of the types of items, such as newspaper, aluminum, steel, scrap metal, cardboard, clipboard, magazines, junk mail and plastic that can be collected at the transfer stations and then taken to the Flagstaff Materials Recovery Facility. In addition, the brochures also highlighted household hazardous waste disposal and local recycling contact information.

After researching various sources for curriculum choices, the Waste Reduction Advisory Committee selected specific curriculum packets for Preschool and Kindergarten through 12th grade. The Science Education for Public Understanding Programs (SEPUPS) were used by the junior high and high school students for more complex assignments which emphasized decision making skills. The Tuba City High School science students created display boards that had samples of metal, plastic and paper items for use in each of the schools. Teacher training was conducted in February and March 1999 to familiarize the teachers with the curriculum packets. The teachers were also guided through the use of the display boards.

As part of the project, a video was to be created and distributed to schools, libraries, Chapter Houses and video stores. Students at the Grey Hills High School were selected as the actors in the video. Unfortunately, the point of contact at the high school changed twice which prolonged the coordination of the student actors and the finalized video script. In May 1999, the Tuba City Wellness Center realized that the many delays in the video production would put them behind schedule. Navajo Nation EPA agreed to provide supplemental funding if they could be incorporated into the video' s script as well. ADEQ approved an extension to August 1999, allowing additional time to complete the video.

Environmental Concerns Organization
"Maricopa Education Project"
Ms. Gina D' Abella
4921 West Mayer Boulevard
Maricopa, AZ 85239
(520) 568-9428
Grant Award: $ 19,989

Proposal:
In rural unincorporated areas of Arizona, residents are handling their own refuse disposal, which often involved hauling their own trash to distant landfills. Several residents have chosen to illegally burn or dump their household waste on their own land or in the surrounding deserts. Without an effective solid waste management system to handle the proper disposal of solid waste, illegal dumping has become a serious problem. In Pinal County, 43 percent of residents reside in unincorporated communities. The Environmental Concerns Organization (ECO) proposed a project, working in partnership with the Southwest Environmental Seminars (SES), to provide elementary schools in the community of Maricopa with stimulating, fun and up-to-date information about their local recycling program. The project proposed to educate students and their families about the impact of their current disposal habits on their local community' s environment by including workshops in 26 classrooms, field trips to the local recycling center and visits to illegal dump sites. The project outline would encourage the use of the local recycling program as an option for proper disposal of solid waste and would be transferrable to other rural communities to potentially impact several Arizona residents facing the same issues in refuse disposal. Bilingual recycling information would be provided as "take-home" literature to enable the students to share with their families. As community members become more informed, they would begin to realize that recycled materials are resources, not trash.

Project:
As mentioned in the project proposal, ECO and SES formed a partnership to implement this recycling education project in the community of Maricopa. ECO surveyed the illegal dumpsites in the area and located three dumpsites to conducting field trips for the elementary students. During the course of the project, ECO was able to place signs at additional sites, allowing the project to impact a total of seven illegal dumpsites. The signs were printed on the front and back side to take advantage of the sign space. The English and Spanish wording on the sign directed the reader to stop polluting and to take their household waste to the Recycling Association of Maricopa (RAM). An illustrated map showing RAM' s location was also included, as well as local phone numbers for solid waste and recycling information.

SES presented workshops in each of the twenty-six classrooms. The information was provided through entertaining stories and classroom activities in a one-hour workshop. The curriculum packets were developed in the early stages of the project to incorporate information regarding the negative impacts of illegal dumping in their community and the positive impacts of their participation in the local recycling program. Education materials were also designed to take home and share with their families. To give the students a chance to see the actual dumpsite locations, ECO organized bus rides to the local area dump sites and to the RAM recycling center.

As a follow up to the workshop schedule that ended in December 1998, SES provided the teachers with education packets to replicate a similar program for their future students. The remaining portion of the project

has involved ECO' s monitoring of the recycling education program. By videotaping the illegal dumpsites prior to the signs being erected, ECO has been able to track the amount of material dumped after the signs were in place. ECO has also documented the project' s promotional aspect, which involved the continual placement of local newspaper articles. The recycling rate, documented by the volume of materials received, was another indicator of the project' s effect on the recycling center and the community as a whole. The community impact of this education project would be more accurately measured after the final report has been submitted in July 1999.

EM Technologies, Inc.
"Educating Arizona: Recycling School Lunchroom Waste through the EM Bokashi Network"
Ms. Monica Durand
1802 West Grant Road, Suite 122
Tucson, AZ 85745-1232
(520) 629-9301
Grant Award: $57,292

Proposal:
The EM Bokashi Network has its roots in Japan, where over one million people participate in a nationwide effort to divert organic waste from the landfills for placement into gardens, parks, green belts and farms. The program sponsor in the United States is EM Technologies, Inc., a non-profit Arizona corporation dedicated to promoting the use of EM (Effective Microorganisms) to achieve a sustainable agriculture and environment. The EM Bokashi Network was established by EM Technologies, Inc., as an environmental education initiative, to promote food waste as a valuable resource that can be recycled back into the soil. The proposed project would involve the representatives in the existing network to help introduce the program to others. The EM Bokashi Network planned to increase community awareness of organic waste recycling by producing bilingual and multi-cultural education materials, sponsoring workshops and developing pilot projects to expand the community of participants including: households, schools, restaurants and businesses throughout Arizona. By demonstrating the reuse of organic waste through demonstration gardens and landscaping techniques at schools, EM Technologies would promote sustainability and the recycling of organic waste.

Project:
With the advanced funds received by ADEQ, EM Technologies purchased the equipment needed to construct demonstration gardens and subsequently found a cost savings that covered additional equipment needed for the project. EM Technologies planned to develop three demonstration gardens, but exceeded their goal by setting up seven different sites. Therefore, their priority was placed on providing technical support and maintenance to the seven demonstration gardens. The demonstration gardens were established to illustrate the reuse of organic waste and how sustainability could be introduced into the school setting.

Scheduling the school presentations and demonstration workshops throughout Arizona established the networking system for this program. EM Bokashi Network activities were featured in several educational and community publications. Some of the schools participating in the project included: Kyrene de la Brisas in Chandler, the Miles Exploratory Learning Center in Tucson, and the Arizona School for the Deaf and Blind. During the second and third quarters, the promotional and networking efforts expanded to Phoenix and Flagstaff and generated many more requests for school demonstration projects. Presentations were held at the

Women for Sustainable Technology Conference held in Phoenix and the Coconino County Board of Supervisors.

The gardens were being used by the teachers as an outdoor classroom to create and impart life science curriculum. Therefore, the project managers invited the teachers who were currently involved in the program to co-author the instructional manual and education materials. EM Technologies began filming some of the segments of the video at the beginning of the project to capture the before and after stages of the demonstration gardens.

An overwhelming response from several year-round schools delayed the production of the video and printed material. In June 1999, EM Technologies requested an extension to November 1999 to complete the above-referenced materials.

City of Phoenix
"Household Hazardous Waste Program"
Mr. Terry Gellenbeck
101 South Central Avenue
Phoenix, AZ 85004
(520) 256-5607
Grant Award: $5,500

Proposal:
The city of Phoenix Solid Waste Education Office proposed a project that would utilize a mascot, named the Captain Toxic, to provide a new school show presentation for the 200 elementary and middle schools within the Phoenix area. The project would also incorporate the distribution of 30,000 activity books at the school presentations. Captain Toxic would provide a fun and interactive approach to communicating the proper disposal of household hazardous waste and other environmental issues such as composting and buying recycled products.

Project:
Within the first quarter of the project, the city of Phoenix secured the contract for the mascot costume so that the school presentations could be scheduled. The activity book was drafted and reviewed by the city of Phoenix and ADEQ staff. The City capitalized on their goal to print 30,000 activity books and actually printed 50,000 based on the economies of scale for printing in quantity.
The remaining tasks of the project focused on distributing the activity books and conducting 200 school presentations with the assistance of Captain Toxic. The project manager used the next three quarters to complete three series of shows, concentrating a higher number of shows during the Earth Day 1999 time frame. The city of Phoenix exceeded their goal of distributing 30,000 and they also exceeded the number of school presentations by performing 371 presentations at elementary and middle schools and at civic events held throughout the city of Phoenix.

Cochise County
"Community Education Program on Waste Reduction"
Mr. Bruce Springer
1415 West Melody Lane
Bisbee, AZ 85603
(520) 432-9479
Grant Award: $60,000

Proposal:
The Cochise County Department of Facilities and Solid Waste proposed a county-wide project to organize a community education program with the ultimate goal of reducing the solid waste stream by at least ten percent by 1999. The project involved the hiring of a full-time waste reduction educator to implement and coordinate a public awareness and education program for the selection, training, and support of community coordinators and school teams throughout the county. The education waste reduction program would be conducted through a partnership between several cities, organizations, the local recycler, local utilities, local media and civic groups. In addition, a citizens task force was established by resolution of the Cochise Board of Supervisors to provide grass root input and coordination. Specific recycling and source reduction strategies would be targeted to reach the adopted waste reduction goals. The target audience would include all residents of Cochise County, and would incorporate age-specific curricula for children and adults. The Cochise County Department of Facilities and Solid Waste would supervise and manage this proposed project.

Project:
To eliminate a delay while hiring the waste reduction educator, Cochise County requested a change to personnel funding that would provide for a program leader to assume the initial project responsibilities of the waste reduction educator position. ADEQ approved and allowed the Program Leader to begin the implementation of the project. Cochise County utilized their task force to target waste reduction and recycling strategies for the seven communities including: Benson, Bisbee, Douglas, Huachuca City, Sierra Vista, Tombstone and Willcox. The cities of Bisbee, Tombstone, Huachuaca City and Cochise County made a budget commitment to purchase approximately seven recycling bins to establish recycling drop-off sites at various locations. An assessment of County recycling opportunities was conducted to assist in developing a recycling infrastructure for the local recycler, Sierra Huachuca Association of Retarded Citizens (SHARC). Work was completed in the first and second quarters of the project to develop a prototype for future recycling directories. As soon as the waste reduction educator was hired, a reporting mechanism was established to document the waste diversion resulting from the public's increased awareness of local recycling activities. In cooperation with other educational institutions, age-specific educational materials were integrated into school curricula to be used in area schools.

By the end of the second quarter, the recycling directories for Douglas, Willcox, Sierra Vista and Tombstone were printed and distributed. Each directory describes how to prepare recyclables, where to take them and contact information for the waste reduction educator. A theme titled, "Let's Talk Trash," was developed to provide consistency in the education program. Community presentations were made to civic organizations and schools. Newspaper and radio campaigns utilized the theme.

After the county-wide recycling education program got underway, the County realized a cost savings in their printing and advertising budget. With ADEQ approval, the County transferred the cost savings to the

recruitment of community speakers for a speakers bureau. If the speakers committed 25 volunteer hours to the project, they would be paid a stipend for their time and energy. Although this new approach provided assistance to the waste reduction educator, it required initial training workshops that delayed other tasks in the project. In addition, school contacts took a while to establish which prolonged the scheduling of the presentations. Consequently, these obstacles prompted the County to request a six-month extension through December 31, 1999. The request will provide additional time to ensure that all tasks of the project are completed.

City of Flagstaff
"Ready for Recycling"
211 West Aspen
Flagstaff, AZ 86001
Ms. Ellen Ryan
(520) 779-0488
Grant Award: $32,922

Proposal:
The city of Flagstaff proposed to coordinate a community education campaign to provide consistent information to the area population in order to increase recycling participation and to reduce the amount of refuse taken to the landfill. With the opening of the Flagstaff Material Recovery Facility (MRF) and the beginning of the curbside recycling program planned for July 1998, Flagstaff needed to have full participation from the community. In order to educate the community as to what can be recycled, the City proposed to produce a video specific to the operations of their MRF, the implementation of the curbside program, and other waste reduction efforts that existed in the area. The project would include several different types of multilingual education, such as media advertising, posters, brochures and copies of the video. In addition, the education materials would be the catalyst for recycling practices to begin and create widespread knowledge of how the MRF could be utilized through other recycling efforts in the greater northern Arizona region.

Project:
The city of Flagstaff coordinated the production schedule for the video in the first quarter. The design of the posters, newspaper ads, television ads and radio ads was completed and finalized early to allow time to create a full media campaign with the local newspaper, the city's quarterly publication, *Cityscape*, and radio and television stations. Flagstaff's Recycling Mascot, "Curby," was incorporated into all aspects of the advertising campaign so the public could associate "Curby" with curbside recycling, glass drop-off sites, proper household hazardous waste disposal, commercial and multi-family housing recycling.

The grant project originally included a mass mailing to all city of Flagstaff residents, but the city re-evaluated the mass mailing due to its high printing cost and time intensive handling. The alternative choice, to use a flyer in the utility bill, offset costs. The cost savings was used to purchase additional radio and television advertising. The posters were laminated to protect them from weather conditions and were designed for reuse at various events to designate recycling cans. Brochure design was drafted in the third quarter and later translated into German, Japanese and Spanish to address the tourist population in the area. The French version is planned for completion in the fourth quarter.

The business and hotel recycling education program had a delayed start due the difficulty in contacting decision makers in corporate offices. The city of Flagstaff hired a new marketing person to implement the commercial program by placing start-up recycling bins at the businesses and coordinating their recycling programs. Follow-up distribution of the posters, brochures, videos and magnets is still needed in order for the project to be completed.

Southwest Public Recycling Association
"Recycling Technical Assistance to Rural Communities & Development of Rural Case Studies"
Ms. Nancy Howlett
P.O. Box 27210
Tucson, AZ 85726
(520) 791-4069
Grant Award: $ 31,150

Proposal:
In ADEQ's *Fiscal Year 1997 Recycling Program Annual Report*, surveys from Arizona jurisdictions indicated their impediments to recycling. Those impediments included the cost of programs, infrastructure and logistical problems, community attitude and education, lack of resources and lack of staff. The development of an alternative solid waste management option, such as recycling, requires significant planning, education of elected officials and professional staff, and funding. The Southwest Public Recycling Association (SPRA) proposed a project that would offer direct technical assistance to 20 rural communities and recycling entities. The technical assistance would be provided through one-on-one consultations with rural Arizona communities on various recycling program options, cost benefits and efficient recycling program operation guidance. In addition, the project would involve the development of ten case studies from these communities, focused on the recycling best practices in rural Arizona. Of the ten case studies, six would include slide show presentations that will document specific waste reduction programs and/or efforts throughout the state of Arizona.

Project:
ADEQ and SPRA selected the following communities and organizations as subjects to highlight rural recycling case studies. The format of each case study included a description of the organization's history and key features, education efforts, funding sources, future plans and the lessons learned. Of the ten case studies that are listed below, SPRA was developed six slide show presentations for the case studies that are printed in bold lettering: 1) Palo Verde Disposal, *Regional Recycling Drop-off Program*, located in La Paz and Mohave Counties; 2) **Environmental Concerns Organization, Inc., *Recycling/Illegal Dumping Education Program*, located in Pinal County**; 3) **Sedona Recycles, *Grass Roots Recycling Program*, located in Yavapai and Coconino Counties**; 4) **city of Williams, *Municipal Curbside Recycling Program*, Coconino County**; 5) Sierra Huachuca Association of Retarded Citizens (SHARC), *Job Training Through Recycling*, Cochise County; 6) Pinal County, *Mobile Drop-off & Office Recycling Program*; 7) city of Sierra Vista, Municipal Composting Program, Cochise County; 8) **Pima, Cochise, & Graham Counties, *Regional Household Hazardous Waste Facility*, located in Pima County**; 9) F&M Recycling, *Private Sector Recycling Program*, located in Navajo County; 10) **city of Yuma, *School Recycling Program***.

SPRA requested additional time to ensure that the project would be implemented as it was originally described in the proposal. The obstacles that the SPRA encountered during the third quarter (April, May, June 1999) were due to the staff changes and project management delays that resulted when the Acting Executive Director resigned. A new Executive Director was hired in April 1999, but had unexpected projects to manage.

All of the finalized case studies and slide show presentations would be utilized by the Arizona Recycling Program staff and would be available to other jurisdictions.

Starr Communications
"Radio Public Service Advertisements Campaign"
Ms. Belle Starr
1281 Burnside Road
Sebastopol, CA 95472
(707) 829-6469
Grant: $24,180

Proposal:
Starr Communications proposed to coordinate a statewide Radio Public Service Advertisement (PSA) campaign to increase the awareness of reducing, reusing and recycling. The campaign will promote the 1-800-CLEANUP phone number and Web site (www.1800cleanup.org). Starr Communications planned to research, write, produce and distribute a total of 12 sixty-second PSAs to radio stations throughout the state of Arizona, including the production and distribution of Spanish PSAs. Starr Communications would join forces with the Environmental Media Association, an organization of people in the media industry who focus on the importance of recycling and a variety of environmental issues. This collaboration would enable the project to include voice-overs from famous stars.

Project:
Starr Communications moved very quickly into production for the first set of PSAs. Originally, the project was outlined to produce three PSAs per quarter, but Starr Communications developed the scripts and acquired celebrity talent faster than anticipated. A total of six PSAs, both in English and Spanish, were completed ahead of schedule and were distributed in the Fall of 1998. The topics focused on timely issues such as precycling, products made from recycled material, waste reduction during the holidays, and new year's resolutions to save the earth. The participating celebrities included Wendie Malick, from *Just Shoot Me*, Julia Louis-Dreyfus, from *Seinfeld*, and recording artist Kenny Loggins. This first release featured an elaborate CD jewel box cover and plastic case that included artwork and introductory information about the campaign and its partners. The overall costs of the jewel box and artwork exceeded the project's budget, therefore modifications were made to the packaging of the CD. The radio PSA releases that were produced later in the project were listed on the actual CD to save on artwork, design and printing costs. Environmental Media Association (EMA) worked well for the first release of PSAs, but shortly after experienced a turnover in key personnel. Complications arose with the replacement at EMA, therefore, Starr Communications requested a change in the subcontractor and ADEQ approved the change to utilize Citizen Planet to recruit celebrity voices.

The second and third release of PSAs included the voices of Wendie Malick, Michael T. Weiss, from *The Pretender*, Wayman Tisdale, former Phoenix Suns Forward and recording artist, and the talent of Belle Starr.

The issues focused on Earth Day, the importance of composting, and the proper disposal of used oil for the Spring and Summer months. Starr Communications monitored the distribution and air time of the radio stations by contacting the news directors, programming staff and receptionists on a regular basis. The final report, due in July 1999, will assist in next year' s assessment of the campaign' s distribution and effectiveness as a public service campaign.

VI. Public Education in Recycling

Since 1990, non-profit organizations, private companies, governmental agencies and the general public have benefited from the public education offered by the Arizona Recycling Program. The benefits have been achieved through the direct and indirect effect of recycling and source reduction workshops, the demonstration of products made from recycled materials, and the distribution of literature that has increased recycling education and awareness throughout the state.

The Arizona Recycling Program focuses on public education for the ultimate goal of influencing human behavior to encourage participation in source reduction, reuse, and recycling of solid waste. Although the basic structure of recycling education is often centered around the hierarchy of reducing, reusing, and recycling solid waste, the Arizona Recycling Program also identifies waste reduction techniques to clarify the 3Rs. These techniques include educating the citizens of Arizona to buy products made from recycled materials, to properly dispose of household hazardous waste, to compost organic matter and to stop illegal dumping. Therefore, when the Arizona Recycling Program communicates the importance of recycling, it is presented as a solid waste management option with the ability to conserve our natural resources, save money, reduce the need for new landfills, reduce pollution and create economic support for the recycling industry.

In addition to the Waste Reduction Initiative Through Education (WRITE) Grant funded projects that are described in Chapter V., Sections C. & D., the Arizona Recycling Program administered various recycling education projects throughout the past year. According to A.R.S. § 49-833 B., the Arizona Recycling Program is required to implement public education through the methods discussed below.

A. Provide Advice and Consultation to Persons, Businesses and Manufacturers on Recycling and Source Reduction Techniques

During FY 1999, the Arizona Recycling Program staff provided advice and technical assistance to jurisdictions, businesses and the general public through the distribution of literature, including "how-to" guides and case studies of specific recycling and source reduction programs. Information is provided for both the WRA and WRITE Grants through formal and informal presentations at schools and businesses to initiate or support the establishment of waste reduction and recycling programs. The Arizona Recycling Program visited businesses and schools to discuss recycling options, how to work with waste haulers and the process of conducting waste audits.

The Arizona Recycling Program is responsible for coordinating statewide public education efforts to increase recycling awareness. The structure of the state' s recycling efforts are community-based. If a jurisdiction offers recycling as an option to their solid waste management system, the specific logistics of that system are usually coordinated by that jurisdiction. If a jurisdiction does not have the infrastructure to establish a recycling collection program, non-profit organizations have utilized volunteer staff to operate grass-roots recycling drop-off programs.

In order for the Arizona Recycling Program to provide specific information to the general public in regards to community-based recycling programs, Program staff communicates with designated recycling coordinators of each jurisdiction. The Arizona Recycling Program works with the recycling coordinators throughout the state in a variety of situations, by sharing information about similar obstacles other communities are facing in their

recycling efforts and exchanging knowledge of new recycling opportunities that are available.

To increase the efficiency of distributing recycling information for a particular community, the Arizona Recycling Program updates and maintains a listing, titled "Public Recycling Program Coordinators List." (See Appendix E) This list provides a point of contact for 102 jurisdictions throughout Arizona. Whenever the public makes an inquiry, the Arizona Recycling Program provides a general overview of statewide recycling efforts and how it correlates with their community's efforts. Source reduction options and local recycling activities are explained to the public and literature is included in the response. The Arizona Recycling Program encourages the public to call their designated recycling coordinator to ensure that any and all community-specific information is provided, such as a current list of accepted recyclables, pick-up days, new drop-off sites and recycling educational programs.

When residential curbside recycling programs are not available to households or apartment dwellers, the Arizona Recycling Program advises the public to create their own system of collecting recyclables at home and locating a nearby recycling drop-off site. In addition, residents are encouraged to call 1-800-CLEANUP or visit (www.1800cleanup.org), a statewide recycling hotline and Web site, to locate the closest drop-off site for their recycling needs.

During FY 1999, the Arizona Recycling Program updated a listing that was originally designed to keep track of the household hazardous waste (HHW) programs that are coordinated by the 102 jurisdictions. In most cases, these HHW programs provided a one or two day event for the residents to bring used paint, motor oil, antifreeze, batteries, household cleaners, tires and pesticides to a centralized location for reuse or proper disposal in a designated hazardous waste landfill. Several of these events were initially supported by grant funding during FY 1997 and FY 1998 and are described under Section IV, "Recycling Grants." Since that time, many of the municipalities in the Phoenix area have instituted HHW events on a periodic basis or they have built permanent HHW facilities for convenient disposal on a regular basis.

The Arizona Recycling Program receives numerous phone inquires regarding the proper disposal of HHW. If jurisdictions do not have a HHW program in place, the Arizona Recycling Program recommends other waste reduction and reuse options. For example, old paint can be donated to neighbors, theater groups, or beautification projects that use old paint to cover up graffiti. Used oil and antifreeze can be returned to most automotive parts and supply stores. The Arizona Recycling Program has referred businesses with larger quantities of batteries, fluorescent lights and solvent-based products to the hazardous waste handlers in the area.

B. Sponsor, Co-Sponsor or Contract Technical Workshops and Seminars on Recycling and Source Reduction Programs

Arizona Recycling Program cooperatively worked with other agencies, non-profit organizations and/or grant recipients to sponsor or co-sponsor workshops and conferences as a means to provide recycling and source reduction program guidance.

The following is a list of the FY 1999 workshops and seminars sponsored by the Arizona Recycling Program:

Co-sponsored Buy Recycled Expo

Buying products made from recycled material is a form of source reduction. Therefore, the Arizona Recycling Program worked in conjunction with the Arizona Department of Commerce (ADOC) to promote the use of recycled products made and/or distributed by Arizona-based companies through industry exhibits and educational workshops. By contracting with ADOC who subcontracted with the Southwest Public Recycling Association (SPRA) to coordinate the Expo, the Arizona Recycling Program co-sponsored the 3rd Annual Arizona "Buy-Recycled Expo," held in Mesa, Arizona, on November 19, 1998. The Arizona Recycling Program staff provided contract oversight and participated on the Buy-Recycled Steering Committee. Technical sessions included presentations from companies that re-manufactured products and also handled the marketing of those products. Other workshop sessions highlighted companies that instituted buy-recycled programs for the purchase of all or most of their administrative needs. The Program assisted SPRA by providing contact names of state purchasing agents, recommended ideas for the conference format and gave a presentation on the state recycling rate.

Co-Sponsorship of Composting Satellite workshop

On January 14, 1999, the Arizona Recycling Program co-sponsored a composting workshop with the University of Arizona's Maricopa and Pinal County Cooperative Extension Offices, the Maricopa County Farm Bureau, the Arizona Recycling Coalition's (AzRC) Organic Products Committee, the Agua Fria-New River Natural Resource Conservation District and the Compost Education & Resources for Western Agriculture (CERWA). The workshop, titled "Compost: A Resource for Western Agriculture," was held at the Maricopa County Cooperative Extension Office in Phoenix. A total of 48 people attended the workshop and were provided a satellite broadcast from CERWA, local speakers, lunch and networking opportunities, and an edited version of a previous CERWA broadcast. The workshop highlighted the uses of compost in agriculture and provided the opportunity for networking among generators of organic waste, composters, and end-users of composted material.

Co-sponsorship of Investment Forum w/ SPRA

The ADEQ Recycling Program partnered with other agencies to co-sponsor the "Rocky Mountain Southwest Investment Forum," held on March 18, 1999, at the Radisson Hotel in Scottsdale. The Southwest Public Recycling Association coordinated a one day investment forum to provide an opportunity for recycling businesses to seek financing from an audience of investors and economic developers. Participating businesses were able to expose this audience of over two hundred investors to their products through exhibit booths and had the ability to network with the investor groups.

Approximately 50 people attended a training session that offered businesses a chance to improve on presentation skills for attracting investors.

C. <u>Administer a Recycling and Source Reduction Database and Hotline Providing Referral Services to Waste Generators</u>

The Environmental/Recycling Hotline -- History

The Hotline started as a computerized interactive phone system that provided the location of local drop-off facilities as residents entered their 5-digit zip codes. Callers could access several sections of information, including the nearest recycling center, information on household hazardous waste, ways to reduce, reuse, and recycle, and purchasing products made from recycled materials.

The Arizona Recycling Program supported the Environmental Recycling Hotline in a variety of ways. In 1992, a Memorandum of Understanding initiated Arizona as the first state to support the "Environmental Recycling Hotline" phone number and its concept of empowering the public with the tools necessary to locate recycling drop-off locations, and have access to environmental tips regarding source reduction, reusing and recycling. Initially, the Arizona Recycling Program provided funding support to assist with the cost of the telephone lines.

As the Hotline system advanced, the Arizona Recycling Program provided funding for promotional and educational efforts to increase public awareness of the Environmental Recycling Hotline services. Subsequent funding also provided for a part-time staff person at Cleanup Inc. to update the statewide recycling drop-off locations on the hotline database.

Through the years, other organizations provided support to Cleanup Inc. to form a public/private partnership that now includes local and national sponsors offering financial, technical, and promotional assistance. With the support of both the public and private sector, this interactive phone and Internet system has grown in its capacity to operate free to the user.

(Cont. on next page)

As stated in A.R.S. §49-833, B. 3, the Arizona Recycling Program is required to administer a recycling and source reduction database and hotline that provides referral services to waste generators. Since 1990, the Arizona Recycling Program has been compiling information for a database of recycling facilities and drop-off locations for Arizona citizens to refer to for their recycling needs. Developing, updating and maintaining a database has been an on-going project for the Arizona Recycling Program. Outreach events, such as site visits and regional conferences, create the opportunity for staff to acquire information on new and existing recycling facilities. The Arizona Recycling Program also works directly with the Arizona Department of Commerce to get updates on any new facilities that have recently located to Arizona.

From 1992 through 1999, the Arizona Recycling Program has worked with Cleanup Inc., d.b.a. the Environmental Recycling Hotline "Hotline" and "Earth's 911," to utilize the 1-800-CLEANUP phone number and Web site as the recycling and source reduction database and hotline that provide referral services to waste generators.

In the urban and rural areas of Arizona, many communities do not have the opportunity to participate in residential curbside recycling programs. By promoting the use of the Hotline system, the Arizona Recycling Program has increased the public's knowledge of local area waste reduction efforts and drop-off recycling facilities.

The Arizona Recycling Program continues to distribute promotional items such as magnets, pencils, rulers and bookmarks that all contain the Hotline's number and Web site. The items are distributed at outreach events for the public to recognize and associate the Hotline's number with recycling and environmental information.

In 1995, the U.S. EPA awarded the Presidential Environmental Technology Initiative (ETI) grant funding to ADEQ to provide Cleanup Inc. with assistance in the expansion of the Hotline program nationwide. As this nationwide expansion took place, residents in each state were able to dial the 1-800-CLEANUP phone number to receive referral services for their communities.

The Environmental/Recycling Hotline, also known as Earth' s 911, has since created a Web site (www.1800cleanup.org) to allow Arizona and all other states to customize information for access through the Internet. Specific environmental numbers and hotlinks on the Web site can be tailored for each community. A virtual library has been developed to house all of the promotional materials that are available to states through the media promotions.

In November 1998, a revised contract was established between ADEQ and Cleanup Inc. to focus on promotional work emphasizing the use of the Hotline phone number and Web site. Four promotional campaigns were designed as part of this contract to increase the awareness regarding Christmas tree recycling, composting, Earth Day activities, and waste reduction through cost effective purchases. (For more information on the campaigns, see "Coordinating a Recycling and Source Reduction Public Education and Advertising Program.")

In FY 1999, staff focused time and energy to develop a Geographic Information System data set by traveling to Arizona communities to get the latitude and longitude readings of recycling drop-off sites. This database information is currently being used to update recycling drop-off site locations to be added to the Environmental Recycling Hotline system and to be used by the Arizona Department of Commerce for their Recycling Infrastructure Web site.

D. Promoting Recycling and Use of Recycled Products

Each new year seems to generate more interest in environmental education and awareness. The number of calls received from the public increases and the number of requests for recycling presentations follows suit. During the FY 1999, the Arizona Recycling Program participated in several outreach events to promote recycling and the use of recycled products. Program staff traveled to local schools to talk with children in kindergarten through 12th grade about recycling. Recycling presentations were also made during conferences and civic group meetings, such as the Kiwanis Club. Each presentation was adapted to the audience and location, but the basic message covered the concepts of reducing, reusing and recycling.

Recyclable materials are often times brought to the presentations to visually educate the public about the items that they can recycle in their community and why those materials may differ from community to community. The standard recycling symbols, illustrated below, are used in the labeling of recyclable product packaging. The basic three chasing arrows means that the packaging is recyclable. The three chasing arrows with the black background means that the packaging is made from recycled material and is usually accompanied with the percentage of recycled content material used in the remanufacturing. The differences between the symbols are explained in presentations and pointed out on the actual products.

Recyclable

Made from
Recycled Material

Recycled content products are showcased at these presentations for increase recycled product awareness, such as carpet made from recycled plastic soda bottles and playground equipment made from recycled plastic milk jugs. The concept of buying recycled products is emphasized to illustrate that recycling not only includes the collection and sorting or recyclables, but it also includes the remanufacturing of recycled products which need to be purchased by the public to close the loop. The audience is also provided with an explanation of the many benefits to reducing, reusing and recycling.

Promotional items, such as rulers, pencils, bookmarks, brochures and stickers, are also made with recycled material and have been distributed in classrooms to further demonstrate the availability of these products. Most of those items contain the 1-800-CLEANUP number for reference and assistance if a particular community does not have a residential curbside program.

Outreach Events Promoting Recycling

America Recycles Day

In 1998, November 15th was again the designated day to celebrate the Second Annual America Recycles Day. The national theme, "If you're not buying recycled, you're not really recycling," had the focus of building consumer demand for recycled products and to educate all Americans about the environmental and economic benefits of recycling. This continued effort to build awareness on the future economic success of recycling stressed recycled content products as a viable alternative to raw or virgin materials. People were asked to pledge to buy recycled by completing a pledge card with their name, address and how they would go about making a change in their daily routine. All pledge cards were forwarded to Washington, D.C., where a national drawing took place for the grand prize. This prize was the American Green Dream Home, which was a home to be constructed out of recycled content and energy efficient materials. The winner could have the home built anywhere in the United States.

State recycling organizations were encouraged to lead statewide efforts in conjunction with America Recycles Day by getting communities involved in recycling events, contests, races and activities designed to promote awareness about recycling and buying recycled content products. A total of 44 states, the District of Columbia, two U.S. territories and Mexico participated. Each participating state adapted the national day to fit their needs, thus the Arizona Recycling Program provided sponsorship to the Arizona Recycling Coalition to plan, coordinate and promote Arizona Recycles Day activities through the assistance and expertise of a statewide steering committee.

Promotion of the Second Annual America Recycles Day truly paid off with over 120 events located through Arizona. This increased from the 30 events held last year. Media attention also increased through television, radio and newspaper coverage. In addition, November 15, 1998 was declared Arizona Recycles Day by

Governor Jane Dee Hull. A celebration ceremony was held on November 13, at the Phoenix Patriots Park. The America/Arizona Recycles Day celebration prompted nearly 16,000 Arizonans to pledge to buy recycled products.

Earth Day '99

The Arizona Recycling Program celebrated Earth Day ' 99 by traveling to events located throughout the state during the month of April 1999. The promotional events were planned and coordinated by jurisdictions and/or non-profit organizations. The Arizona Recycling Program participated in many of these events by setting up a display booth with an interactive game, entitled the "Close the Loop" game. Events included Earth Day celebrations at: (1) the city of Phoenix "Sunday on Central" event, (2) the Sedona "Earth Day Festival," (3) Oracle State Park, (4) the Arizona Department of Game and Fish' s Wildlife Rehabilitation Center Open House, and at (5) the Phoenix Zoo.

E. Administrating a Recycling and Source Reduction Research and Development Program

Research and development for recycling and source reduction projects within Arizona have been coordinated through grant projects and separate contracts. Innovative technology and research and development in recycling have always been included in the objectives of the Waste Reduction Assistance (WRA) Grant program. However, comparing a project that would immediately divert large quantities of materials from the waste stream to a project that had the potential to divert even greater amounts of material, but in the future, was always a challenge. Therefore, in 1998, the Arizona Recycling Advisory Committee made the decision to reserve a certain portion of WRA grant funds specifically for research and development projects. This initiated the Waste Reduction Assistance Research and Development (WRA R&D) Grant program. The new program would allow R & D proposals to be evaluated in relation only to other R & D proposals, leveling the playing field for projects of this type. The objective of the WRA R&D Grant program is to develop tools and ideas that will help to divert significant amounts of material from the solid waste stream in the future. Examples of projects that would be consistent with this objective are technology development, feasibility studies and solid waste audits. The WRA R&D Grant funding was first awarded in FY 1999 and the program continues through the present.

The Arizona Recycling Program realize that networking opportunities increase research opportunities for new technology in feedstocks, equipment and end-use. Therefore, consultations with recycling businesses, waste haulers, processors and re-manufacturers are crucial in promoting the recycling industry. The methods for collecting recyclables, processing the materials and the locating of new markets will need to evolve quickly to address the public' s demand for proper solid waste disposal practices.

F. Coordinating a Recycling and Source Reduction Public Education and Advertising Program that includes the use of existing publications from public and private resources, as well as publishing necessary new materials on source reduction

There are several recycling education and awareness programs that have been successfully implemented by communities throughout Arizona. Often times, municipalities do not have a budget available for the production of recycling education materials. The Arizona Recycling Program can assist Arizona communities with recycling education curriculum and tools for use in their communities at little or no cost.

During the FY of 1999, the Arizona Recycling Program completed its goal of developing an inventory of the

various types of educational publications and materials that are available through the ADEQ to schools, municipalities, non-profits and the general public. This inventory list has provided the Arizona Recycling Program with an understanding of what is currently being used for the purpose of promoting recycling and what will need to be developed in the future. This inventory has been added to the Program Web site for the public to access. Grant-funded resources resulting from the WRITE Grants and contracts have been developed for age-specific or category-specific groups. These recycling education resources are required to be transferrable to other communities to support their endeavors to start-up or expand recycling education and waste reduction programs. The Arizona Recycling Program has also acquired a clearinghouse of literature, brochures, video tapes, manuals and slides resulting from grant projects and from other state and federal agencies. This use of literature from other organizations is encouraged in order to limit the extra production of the same type of guidance document.

Statewide Recycling Industry Newsletter

In an effort to get information to the many businesses, organizations, schools and agencies who have an interest in the recycling industry, ADEQ has provided funding since 1991 to the Arizona State University for the development and design of the *Arizona Recycling Review* newsletter. The *Arizona Recycling Review* newsletter is a cooperative effort of Arizona State University, the Arizona Recycling Program, the Arizona Public Service Company, and the Arizona Recycling Coalition. Approximately 5,000 newsletters are distributed on a quarterly basis with extra circulation at promotional events and conferences. This publication strives to present information in an objective and professional manner. The articles provide information concerning municipal and private sector recycling programs, recycling events, innovative technology and federal and state regulatory information.

The Arizona Recycling Program works cooperatively with other newsletters, such as the Arizona Department of Education' s *Education Express*, ADEQ' s *Trash Talk* and *The Arizona Environment* newsletters, to highlight recycling education projects by providing information and articles.

Recycling and Source Reduction Public Education and Advertising Program

During FY 1999, a series of four campaigns were set for completion during the months of November 1998 through June 1999 to promote the use of the Environmental Recycling Hotline (Hotline) system. The Hotline, owned by Cleanup Inc., can be assessed through their Web site at www.1800cleanup.org or by calling 1-800-CLEANUP. (For more information on the Hotline, see Section C. Administer a Recycling and Source Reduction Database and Hotline Providing Referral Services to Waste Generators.)

The first campaign, the "12 Days of Christmas" was kicked off in November with the coordination of the "Treecycle" project. The Arizona Recycling Program coordinated the mailing of 130,000 red, tree-shaped, made-from-recycled-paper, tag ornaments to approximately 30 communities located throughout the state. The communities then distributed the tree tags to Christmas tree retailers, who attached the ornaments to the trees. By using the Treecycle tags as a reminder to call 1-800-CLEANUP or visit the Hotline Web site, the public was able to determine their local drop-off site, where the trees would be mulched and reused in community parks. The Hotline coordinated the promotional campaign, that included radio public service advertisements, the development of camera ready artwork for newspaper advertising and the mailing of promotional packets to the recycling coordinators. To monitor the Christmas tree diversion results from year to year, the Arizona Recycling Program compiles survey information. With the contribution of the Treecycle ornaments and the use of the Hotline, the results indicated that Arizona recycled 200,000 Christmas trees and saved 1,880 cubic yards

of landfill space. To visualize the number of trees diverted from landfills, imagine if all of those trees were laid on the ground from end to end -- they would equal the distance from Phoenix to Tucson and back again.

To gear up for Arizona's composting season, the second promotional campaign advertised the new "Composting Section" that was added to the Hotline system in March 1999. This section included composting methods for yard waste, kitchen scraps and other organic wastes. Cleanup Inc. handled the distribution of promotional materials that were designed for continuous use throughout the year to encourage composting as a daily habit.

The next campaign was implemented shortly thereafter to coincide with Earth Day, on April 22. The campaign, "Make Every Day Earth Day," centered around a video that was developed through the contract. The video, "Handy's kids...Making Every Day Earth Day," features "Handy," the animated mascot established by the Environmental Hotline. "Handy" was created to provide children and parents with an entertaining and informative look at ways to reduce, reuse and recycle. The video was distributed to the recycling coordinators of each jurisdiction to assist with their outreach events during Earth month. Distribution to public libraries and elementary schools as well as newspaper and magazine advertising promoted of the video's availability.

The fourth and final campaign, "Save Money and the Environment Too," was coordinated during the months of May and June 1999, but will not be promoted until the month of August 1999. The strategy for distribution was modified to better communicate with the target audience. Promotional materials will include a press release, live radio public service advertisements, a newspaper advertisement, a newspaper shopping section insert and a video tape containing television public service advertisements.

As a component of each Hotline campaign, packets containing samples of the promotional materials were forwarded to municipal recycling coordinators to compliment their existing recycling education and promotion budget. The Arizona Recycling Program expanded the mailing list of recycling coordinators to include additional contacts in the recycling industry as these campaigns provide general recycling information that can be applied to any community. In addition, Cleanup Inc. provided the Arizona Recycling Program with a tracking report to evaluate the effectiveness of each promotional campaign.

The Arizona Recycling Emblem

The Arizona Recycling Emblem encompasses a cactus with the three chasing arrows, an oval frame that surrounds the cactus, and bears the slogan "Arizona Cares Reduce, Reuse, Recycle." It provides a recognizable symbol for recycling in the state. To promote the use of the Arizona Recycling Emblem on a continuous basis, the Arizona Recycling Program encourages other recycling organizations to use the emblem to create a uniform look for Arizona's recycling image. When possible, most of the promotional items, such as rulers, pencils, pens and stickers, include the Arizona State Recycling Emblem.

To fulfill the statutory requirement that the recycling emblem be adopted by rule, ADEQ proposed a rule in June 1998 to establish minimal guidelines. The rule provides a description of the emblem, the use of the emblem as a tool to promote recycling education, and also describes how a person or organization can obtain a copy of the emblem.

G. <u>Recommending to educational institutions courses and curricula in areas related to recycling and</u>

source reduction or encouraging the development of courses in managing solid waste

The Arizona Recycling Program worked with the Arizona Department of Education and other environmental education groups to establish and encourage waste reduction projects and school curricula.

Waste Reduction Software Program

ADEQ awarded a grant to the Environmental Education Exchange to create a computer software program for students in grades four through six. The software program, titled "Mission 3R," is an entertaining hands-on program which encourages students to reduce the waste that they are generating, buy recycled products, recycle and compost organic matter. This software program is designed to score the student's choices and provide a grade at the end of the game. In October 1996, the first mailing of the Macintosh™ compatible software was forwarded to approximately 800 schools at no cost. In August 1997, the Environmental Education Exchange created a PC version of the "Mission 3R" software program to distribute to those schools that have IBM™ computers. The "Mission 3R" disks were intended to be checked out of the library and loaded onto their classroom computers by the teachers. A teacher's guide is accessible through the program to provide teachers with guidance, such as scoring methods and definitions. Other classroom activities pertaining to solid waste awareness are included in the teacher's guide.

In June 1998, the Arizona Recycling Program contracted with the Environmental Education Exchange to upgrade the technical animation and audio segments of the entire program, as well as to change the 4-disk installation to a CD-ROM. Completion of the revised Mission 3R CD-ROM is planned for January 2000.

Essay Contest & School Recycling Projects

The *AZ Recycling Review* Advisory Committee (Committee) includes representatives from the Arizona Department of Environmental Quality, Arizona State University, Arizona Public Service Company, and the Arizona Recycling Coalition. The goal of the Committee is to provide recycling information and education to the public through the *AZ Recycling Review* newsletter.

In February 1999, an essay contest was initiated by the Committee to increase solid waste awareness and to motivate school recycling activities throughout Arizona. The essay contest was targeted at 11th grade high school students to promote creative concepts of the 3Rs ...Reduce, Reuse, and Recycle. With the submittal of an essay that describes a school solid waste awareness project, the students get the chance to learn the environmental, economic and community benefits of the 3Rs and the opportunity to win a scholarship to the college or university of their choice. The awarded projects needed to be designed for implementation during the following school year. If the school provided a letter of commitment to implement the essay proposal within their school system, additional funding would be provided to the essay winner's school to pay for the project costs. The winning essays were selected in May 1999 and presentations were scheduled at the beginning of the next school year to acknowledge the students and their supporting schools.

Elementary School Composting Projects

On May 11, 1999, the Arizona Recycling Program participated on a review board to evaluate composting proposals submitted by elementary students at Constitution Elementary, in Phoenix. Phoenix Clean & Beautiful coordinated the event and requested the assistance of the review board, who also consisted of representatives from the city of Phoenix, Constitution Elementary, the Maricopa County Cooperative Extension and Phoenix Clean & Beautiful. The proposals were evaluated based on the most feasible plan for a school composting

facility. Students described their goal for the project and the plan of action to collect compostable material and to construct a facility to fit their project' s needs. Proposals also included a timeline, the construction supplies, and an estimated budget. The review board determined that all of the proposals had winning concepts. The City recommended that the students re-evaluate the need to purchase construction materials to build compost bins, and suggested that they use renovated compost bins supplied by the City at no cost. The Arizona Recycling Program provided guidebooks and reference material to assist the students with their future composting activities. The Arizona Recycling Program supports projects such as this that encourage students to use their decision-making skills and project planning techniques to generate awareness on the benefits of recycling and/or composting.

Other Courses

The University of Arizona' s Cooperative Extension developed the Master Composter' s Training Course several years ago, and the training has continued to be utilized as a worthy professional development workshop. The Arizona Recycling Program supports the Cooperative Extension offices throughout Arizona by recommending the training of home composting techniques to the interested parties. During FY 1998, the Arizona Recycling Program attended this training to provide technical assistance for composting inquiries.

H. Upcoming Fiscal Year 2000 Projects

FY 2000 Planned Projects

The following includes a list of public education projects planned for implementation during FY 2000:

- Annual SWANA/NAHMMA Hazardous Materials Management Conference

The conference will focus on cost effective, innovative and environmentally safe options for managing hazardous materials for households, small businesses and universal waste.
November 15-17, 1999
Tucson, AZ

- "Bear Essential News for Kids"

A promotional campaign targeted to elementary kids will run every month for a full year in the Bear Essential News for Kids publication. Recycling facts, contests and trivia games will be included each month.

- The 3rd Annual America/Arizona Recycles Day

An awareness campaign planned for Fall 1999 will promote the theme, "For our children' s future...buy recycled today!" for November 15, 1999, America Recycles Day. Several Arizona municipalities, private companies, and non-profit organizations will participate to increase the awareness of the buying recycled products.

-The Arizona Recycling Program' s 2nd Annual Essay Contest

The Arizona Recycling Program Essay Contest will again offer 11th grade high school students the opportunity earn money for college while helping to save the environment. The essay contest will encourage 11th grade high school students to promote creative concepts of the 3Rs ...Reduce, Reuse, and Recycle, so that students will learn the environmental, economic and community benefits of reducing the amount of trash generated by our society.

VII. Recycling Market Development Program

The Arizona Recycling Program assists in the funding of the Arizona Department of Commerce's (ADOC) Recycling Market Development Program (A.R.S. §49-837.B.5.). The Recycling Market Development Program was created to develop local recycling markets for Arizona' s recycling programs and to assist in the creation of jobs and capital investments by recycling-based businesses. Specifically, the program encourages the use of recycled materials as manufacturing feedstocks for new and existing Arizona businesses, attracts recycling-based businesses to the state and assists existing Arizona recycling companies with business expansions. In order to accomplish these goals, the Recycling Market Development Program works closely with public, non-profit and private economic development and recycling officials.

A. Arizona Recycling Market Development Program Background

Since 1992, the Arizona Recycling Market Development Program has assisted recycling-based businesses, that have located new plants or expanded existing operations in Arizona. These companies have created over 1800 jobs and their combined capital investment exceeds $320 million.

The Arizona Recycling Market Development Program was launched in 1992 with the passage of Senate Bill 1287, that created a recycling market development program housed jointly at the Arizona Department of Commerce (ADOC) and the Arizona Department Environmental Quality (ADEQ). The program is funded by a portion of the 25 cents per ton landfill user fee surcharge.

In 1993, the State legislature adopted the Arizona Environmental Technology Bill (A.R.S. §41-1514.02) creating the Environmental Technology Office and providing significant tax benefits to large recycling companies that committed to an Arizona location through mid-1996. In 1994, ADOC was awarded a "Jobs Through Recycling" (JTR) grant from the U.S. Environmental Protection Agency (U.S. EPA) to support the State's recycling market development efforts.

JTR grant monies were used to fund the 1996 Arizona Recycling Market Development Study, that was jointly funded by the U.S. EPA, ADEQ and ADOC. The study was the first of its type in the nation to provide comprehensive information on the growth and development of a statewide recycling economy. The study provided baseline information designed to assist in the attraction of key recycling businesses and to help existing operations expand in Arizona. According to the study, Arizona' s recycling industry contributed over half a billion dollars to the state' s Gross State Product in 1995. During the same year, the recycling industry also accounted for $616 million in direct capital investment and 3,427 direct jobs.

In 1996, ADOC received a second JTR grant to promote targeted recycling business development in rural and economically depressed areas of the state. ADOC received its third JTR grant in late 1998 for the *Rural Recycling Business Initiative*. This project will work closely with ADEQ to provide the information necessary to establish recycling businesses in rural and tribal areas of the state. Specific development tools will include geographic information databases, on-line and print media that will identify and link regional waste streams, eco-industry sites and sources, and users of recyclable materials. Tools will be posted on the World Wide Web and marketed to assist local economic developers, attract new industries and help to mentor similar efforts across the country.

As a result of ongoing financial support from and a strong partnership with ADEQ, along with U.S. EPA funds to augment the program' s budget, Arizona' s Recycling Market Development Program is considered a model through out the country.

B. Recycling Market Development Results

1. Conference and Program Sponsorship

Third Annual Arizona Buy Recycled Expo

The Recycling Market Development Program managed and co-sponsored with ADEQ, the *Third Annual Arizona Buy Recycled Expo*. The Expo was held on November 19, 1998, in Mesa. The Arizona Recycling Coalition was awarded the contract to conduct the Expo and subcontracted with the Southwest Public Recycling Association to coordinate the event. The conference was tailored to attract public and private sector purchasing managers and introduce them to Arizona-made recycled products. Prior to the Expo, presentations were made to Phoenix and Tucson chapters of the National Association of Purchasing Management and the National Institute of Government Purchasing.

Nearly 30 vendors participated in the Expo, that attracted 125 attendees. The day featured six educational sessions and a series of roundtable discussions in the afternoon. A recycled clothing fashion show was held during lunch and Will Ferretti, Executive Director of the National Recycling Coalition, ended the event with a drawing for America Recycles Day product prizes. A *Buy Recycled, Arizona!* guide was developed for conference attendees. The 40-page guide included general buy recycled information, sample recycled product purchasing policies, information on recycled products available on state contract, a listing of vendors at the Expo and a resource list.

Southwest Recycling Investment Forum

ADOC provided financial support for the first Southwest Recycling Investment Forum held in Scottsdale on May 18, 1999. The investment forum, coordinated by the Southwest Public Recycling Association, sought to identify capital for local recycling businesses. At the event, seven pre-selected recycling businesses seeking equity capital presented their investment opportunity to an audience of investors and business development officials.

The investment forum was held in conjunction with an event sponsored by the International Association of Angel and Venture Capitalists, *How to Become an Angel Investor*. This event attracted over two hundred investors and entrepreneurs. As a result, recycling businesses that presented at the Southwest Recycling Investment Forum were able to also participate in the larger

Angel Investor Forum, which provided additional networking opportunities. As a result of the investment forum, five of the presenting business identified potential investors.

Arizona Sustainable Forestry Partnership

Since the release of the study, *Potential for Using Small Diameter Ponderosa Pine Resources in Arizona*, the Partnership has continued to grow. The group' s mission is to develop a new environmentally and economically sustainable forest industry in Arizona. This industry will utilize small diameter Ponderosa Pine and other available underutilized wood species, in order to improve forest health, prevent devastating wildfires and provide jobs to the region.

The group has conducted workshops to demonstrate to industry the value in working with small diameter timber. The Partnership also recently partnered with the Blue Ridge Demonstration Project and the Four Corners Sustainable Forestry Initiative. The Arizona Department of Commerce will continue to guide this effort through the project' s steering committee and work with companies interested in using waste wood and small diameter timber in their manufacturing operations.

Rural Recycling Business Initiative

Many rural communities have begun to request individual recycling market development assistance from the Arizona Department of Commerce. Adequate technical and planning assistance is difficult to provide to all rural areas of the state. Further, some individual rural communities lack the resources to attract recycling industry, and are often unaware of suitable waste streams in their own region that could be used as a manufacturing feedstock.

In an effort to address these issues in a widespread and strategic fashion, a U.S. EPA grant will fund the establishment of an on-line database and hyperactive mapping system where local waste streams, infrastructure, market access and labor pools will be matched to business needs through on-line data profiles. Existing collection sites, processors and end-users along with community resources will also be listed in order to facilitate the successful location of recycling industries in rural and tribal communities. The Internet will be used as a virtual marketing tool and monitoring medium for unlimited access by interested communities, economic development organizations and prospects/clients.

2. Marketing and Outreach

The Recycling Market Development Program worked in conjunction with ADEQ to survey existing collectors, processors, brokers and end-users of recycling materials. The survey data, housed at ADOC, is used to calculate the state' s recycling and diversion rates. The survey also tracks recycling industry investment and job creation.

In addition, Recycling Market Development Program staff participated in the following events to promote recycling market development efforts in Arizona and highlight the State as an ideal recycling business location:

National Recycling Coalition – Albuquerque, NM
Recycling Market Development Roundtable – San Francisco, CA
Governor' s Rural Development Conference – Sierra Vista, AZ
Third Annual Arizona Buy Recycled Expo – Mesa, AZ
Arizona Recycles Day - statewide

Program staff also visited numerous local communities, both urban and rural and tribal nations to educate and assist local economic development officials and community members in their economic development efforts.

3. Administration

During FY 1999, the Recycling Market Development Program coordinator position was unfilled for six months. As a result, the number of recycling businesses assisted is lower than in previous years. ADOC was awarded an $80,000 U.S. EPA JTR grant in September 1998.

4. Business Development & Technical Assistance

The Recycling Market Development Program assisted eight companies with Arizona site location, expansion and/or start-up of operations. These companies received site location assistance, financing help, permitting assistance, identification of recyclables and incentives information. They will create 150 new recycling jobs in the state within three years and make capital investments exceeding $13 million. In addition, these businesses with divert over 60,000 tons of secondary material from Arizona' s landfills annually. Recyclables handled by these companies include fiber (paper), waste oil, tires, carpet, carpet pads, grease, septage, wood, aluminum, copper and steel. The companies include:

American Surface Technologies – This company established their corporate headquarters in Scottsdale. They manufacture a playground safety surface made from shredded tires. A demonstration of their product was recently completed at a Mesa elementary school.

Community Recycling Services – A new multi-material processor in northern Arizona. The company' s owner owned recycling and trash disposal companies in Phoenix before retiring to Payson. Six months after opening, Community Recycling Services shut its doors after it was unsuccessful in developing commercial and residential recycling programs in Payson.

Greenstone Industries – A manufacturer of cellulose insulation made from old newspaper, this company expanded and relocated in Phoenix. They utilize 35,000 tons of old newspaper and telephone directories each year in the production of insulation. The company was previously located in Chandler.

Heritage Environmental Services – An industry leader in household hazardous waste recycling and disposal, Heritage located a household hazardous waste (HHW) aggregation plant in Coolidge, at the former Proler steel recycling facility. The facility will handle oil, paint and various types of

HHW. HHW will be shipped to various recycling and final disposal operations throughout the country.

Hydroxyl Systems – This Canadian-based company will establish a Phoenix operation to reclaim non-hazardous liquid waste including septage, grease trap waste and carwash waste water. Their end product is a soil amendment. The company will process up to 36 million gallons annually.

K&B Tire Company – A family owned, woman–run business, the company expanded and planned to recycle 27,000 tons of tires per year. The company' s original contract with a solid waste management company was canceled as a result of a merger. In April 1999, K&B Tire closed its doors. A new company, USMX Inc., has been formed by K&B Tire' s owners to recycle tires.

Universal Entech – Universal Entech recycles waste wood into a variety of products, including animal bedding and mulch. The company has expanded into the processing of construction waste, specifically high grade dimensional lumber, paper and metal. With the expansion of their Phoenix operation, the company will have the capability to process 10,000 cubic yards of material during the next year.

Waste Not Recycling Centers – This Phoenix-based carpet pad processor recently expanded to process Nylon 6 and Nylon 6.6 carpeting for recycling. The baled carpeting is purchased by carpet manufacturers in the Southeast and used in the manufacturing of new carpeting. By the third year of operation, Waste Not will process 4,500 tons of carpet each year.

5. Fiscal Year 2000 Projects

The current fiscal year includes ADOC/ADEQ sponsored programs and the implementation of the 1998 EPA JTR grant. The following projects are planned over the next fiscal year:

Southwest Public Recycling Association' s
Southwest Recycling Market Development Conference – October 27-28, 1999

Sponsorship of this conference will support educational sessions on recycling market development. Monies will also be used to provide scholarships to economic development officials and recycling entrepreneurs.

Rural Recycling Business Initiative

During this fiscal year, the recycling business database will be completed. In addition, GIS mapping by ADEQ of rural recycling collection sites will also be finalized. The Web site will be developed and include a hyperactive mapping system where local waste streams, infrastructure, market access and labor pools will be matched to business needs through on-line data profiles. Existing collection sites, processors and end-users, along with community resources, will also be listed in order to facilitate the successful location of recycling industries in rural and tribal communities. The site will also feature information on rural waste stream characterization developed under an ADEQ recycling grant.

Recycling Market Development Round table – Winter, 2000

ADOC plans, in conjunction with ADEQ and the Arizona Recycling Coalition, to hold a workshop designed to educate recycling officials on various recycling market issues and to receive input on recycling market development needs.

2nd Annual Southwest Recycling Investment Forum – Spring, 2000

Support monies will be provided to the Southwest Public Recycling Association for the planning and coordination of this event, designed to help start-up and expand recycling business access equity capital.

Arizona Recycling Coalition First Annual Conference – May 15-16, 2000

ADOC will play an active role in the planning of this event, including the development of educational sessions on recycling market development. In addition, ADOC will assist in the promotion of the event, in order to market Arizona as an ideal recycling business location.

VIII. Used Oil Recommendations

The annual report is required by A.R.S. §49-832.C. to include recommendations on the feasibility of maximizing the use of: a) re-refined oil for state lubrication needs,[1] and b) the state' s use of used oil as the oil feedstock of re-refiners.

A. Use of Used Oil for the State's Lubrication Oil Needs

As was first reported in the 1996 annual report, automobile warranties do not prohibit the use of re-refined (recycled) oil for engine lubrication. Auto manufacturers and the oil industry do not distinguish between re-refined oil and virgin oil. Many brands of lubricating oil are sold in containers that indicate a portion of the oil is re-refined by displaying the recycled content symbol. However, as there is no recognized distinction between re-refined and virgin oil, re-refined oil may be purchased in a container that does not identify its contents as re-refined. Therefore, consumers may be purchasing recycled content oil without realizing it.

Guidelines set by the American Automobile Manufacturers Association, the American Petroleum Institute, the Society of Automobile Engineers, the American Society of Testing Materials, and the Chemical Manufacturers Association do not distinguish between re-refined oils and virgin oils. In addition, all three major United States automobile manufacturers (Ford, General Motors, and Chrysler) recognize that re-refined oils meet the performance criteria in their warranties. However, neither all re-refined nor virgin oils meet these industry standards. Engine oils must be licensed indicating that they meet the current American Petroleum Institute (API) designations to guarantee performance and a valid warranty. Consumers must look for an API symbol (see figure 8.1) on the oil container to be sure the oil they are purchasing meets warranty standards.

Figure 8.1: The American Petroleum Institutes donut and starburst symbols. Lubricant packages displaying these symbols meet all auto warranty standards.

Though foreign automakers as a group have not officially announced they recognize the use of re-refined oil for lubricating needs in their products, foreign manufacturers do not prohibit their use. In fact, Mercedes Benz uses re-refined oil in every new can manufactured in Germany and South Carolina. It is recommended that concerned consumers make inquiries to individual foreign auto makers to allay uncertainties. The cost of re-refined oil has become competitive with virgin oil. In 1994, the U.S. Postal Service used re-refined oil in 105,600 vehicles and saved up to five cents per gallon. Re-refined oil now exists that: 1) meets the warranty requirements of automobile manufacturers, and 2) has become competitive in price with virgin oils. With this in mind, the Arizona Recycling Program encourages the continued use of American Petroleum Institute licensed re-refined oil as a lubricant in the State' s fleet vehicles and its use by the public at large.

[1]The information contained in this section was obtained from "Re-refined Oil;" the Buy Recycled Business Alliance, 1996.

B. The Use of This State's Used Oil by Re-refiners or as a Lube Stock

Quarterly and annual reports submitted to ADEQ's Solid Waste Section from the used oil industry in Arizona indicate that 19,163,062 gallons of used oil were collected during the 1998 Calendar Year. This represents a 37 percent increase over the previous year. This increase may be the result of a new reporting system for the used oil industry instituted by the State. However, portions of the increase may or may not be attributed to an increase in the amount of oil collected due to increases in the amount of oil used, and the more conscientious disposal of used oil by Arizona citizens. Table 8.1 gives the breakdown of the uses of the recovered used oil.

In 1998, the industry re-used 11,744,498 gallons of used oil in Arizona. The vast majority of this, 11,486,848 gallons, was burned in asphalt and concrete production and energy recovery. The remaining 257,650 gallons was recycled as form oil.[1] Therefore, 1.3 percent of the oil collected in Arizona was recycled within the state. The Arizona used oil industry exported 7,418,564 gallons of used oil to California, Indiana, Nevada, and Texas. The destination of a small portion of this used oil, 48,234 gallons, was not identified. Burning, including the use of the oil as bunker fuel, consumed 5,719,058 gallons, while 1,699,506 gallons was recycled as either lube stock or re-refined. Therefore, a total of 1,957,156 collected from sources in Arizona was recycled. This results in a recycling rate for used oil of 10.2 percent.

Table 8.1: Uses of used oil collected within Arizona during the 1998 calendar year. Figures recorded are in gallons.

Use	Arizona	California	Indiana	Nevada	New Mexico	Texas	Unknown	Total
Lube Stock			1,682,006					1,682,006
Re-Refiners		17,500						17,500
Form Oil	257,650							257,650
Recycled Total	257,650	17,500	1,682,006					1,957,156
Burned	11,486,848			848,290	940,461		48,234	13,323,833
Bunker Fuel		1,866,592				2,015,481		3,882,073
Diverted Total	11,486,848	1,866,592		848,290	940,461	2,015,481	48,234	17,205,996
Total	**11,744,498**	**1,884,092**	**1,682,006**	**848,290**	**940,461**	**2,015,481**	**48,234**	19,163,062

The 10.2 percent used oil recycling rate for 1998 is a significant decrease from the 18.4 percent recycling rate for 1997. Though more used oil was recycled in Arizona as form oil, and there was an increase in the amount of used oil exported to Indiana as lube stock, a decrease in the amount of used oil exported to California to be recycled, and no used oil was identified as being exported to Alabama for recycling as had been the case in 1997. In addition, 98.7 percent of the possible feed stock for re-refined used oil is not being utilized by recycling industries within the state. This represents a significant loss of revenue in the form of value added to the material in its re-refined state. The Arizona Recycling Program encourages the development of the oil re-refining industry within Arizona. This would supply jobs and revenue for the state, while helping to increase the used oil recycling rate.

[1] Form oil is used to coat the inside surface of forms, molds, and used to shape concrete structures in the construction industry. The oil lubricates the inside surface allowing the forms to be removed easily once the concrete has hardened.

IX. Recycling Opportunities, Impediments and Disincentives

The Arizona Solid Waste Recycling Act of 1990 (A.R.S. §49-832.C.6.) requires that recycling opportunities, impediments and disincentives be reported annually. This Section will relate the most common of these mentioned by respondents to the FY 1999 Annual Waste Reduction and Recycling Questionnaire. Opportunities, which will be discussed first, may be useful to communities considering the implementation of a recycling program. The impediments and disincentives are closely monitored by the Arizona Recycling Program to direct resources toward problems which inhibit the growth of recycling in the state. It is important to note that this information is subjective and reflects the opinions and experiences of the respondents.

A. Opportunities that Encourage Recycling

The most identified opportunities for recycling were: 1) existing programs, 2) community involvement and support, 3) financial benefits and 4) cooperation and partnerships. A complete list of the stated opportunities and incentives, as well as a list of the reporting jurisdictions, is provided in Table 9.1.

1. Existing Program Opportunities

The most frequently identified opportunity or incentive to recycle remained constant over the past five years. It is the availability of existing programs. Nineteen jurisdictions identified this issue. Programs have been divided into two categories: 1) the program type and 2) the type of organization offering the program. Jurisdictions stated that drop-off sites, curbside pick-up, scrap metal/white goods collection and greenwaste collection programs provided the greatest opportunity to their community to recycle. Although this was the most cited opportunity in this survey, there are more jurisdictions that have existing programs than just those that sited this as an opportunity. This discrepancy was mostly accounted for in the areas of drop-off, curbside and greenwaste collection programs.

2. Community Involvement/Support

The second most frequently identified opportunity or incentive to recycle was community involvement and support. Again, this remained consistent for the past five years. It seems that the factors that were identified in community involvement were closely affected by one another. A positive attitude toward recycling or environmental stewardship proved to be the largest factor for community involvement and support. The strong support of city governments also seemed to have a great affect on the attitudes toward, and participation in, recycling programs.

3. Financial Benefits

The financial benefits of recycling remained the third most identified incentive to recycle. The city of Tucson received a grant from the U.S. Environmental Protection Agency to offer on-site collection of recyclables to up to 300 small businesses. The city of Glendale stated that a new materials recovery facility that will decrease the cost charged to the community was an incentive, and the city of Sierra Vista stated that the rise in landfill tipping fees provided an incentive to recycle.

Table 9.1 Opportunities and incentives to recycle in Arizona as identified by local jurisdictions within the state. The number of jurisdictions identifying each opportunity is given in the middle column. The jurisdictions identifying the opportunity are given in the right column. Subcategories are given if several jurisdictions identify similar opportunities or incentives.

Opportunity or Incentive	Number	Jurisdictions
Existing Programs	**19**	
Program Type	**17**	
Drop-off Programs	5	Cottonwood, Kingman, Mesa, Sierra Vista, Tucson
Curbside Programs	4	Clarkdale, Flagstaff, Glendale, Tucson
Scrap Metal/White Goods Programs	3	Mesa, Sierra Vista, Tucson
Greenwaste Collection Program	3	Mesa, Sierra Vista, Tucson
Multi-unit Recycling Programs	1	Mesa
Program for Large Volume Clients	1	Tucson
Offering Organizations	**2**	
Private Companies	2	Cottonwood, Kingman
Community Involvement/Support	**14**	
Positive Attitude Toward Recycling	7	Casa Grande, Cottonwood, Eagar, Flagstaff, Gilbert, Payson, Springerville
Environmentally Aware Citizens	3	Eagar, Sierra Vista, Springerville
Individual Effort/Participation	2	Chandler, Prescott Valley
Imported Recycling Habits	1	Goodyear
Volunteerism/Community Events	1	Chandler
Financial Benefits	**7**	
Received Grant Money	4	Douglas, Eagar, Springerville, Tucson
Commercial Rates for Recycling Bins	1	Mesa
Rising Tipping Fees at Landfills	1	Sierra Vista
New MRF Will Lower Transportation Costs	1	Glendale
Educational/Awareness Programs	**7**	Douglas, Eagar, Flagstaff, Gilbert, Mesa, Springerville, Tempe
Cooperation and Partnerships	**6**	Douglas, Chandler, Cottonwood, Glendale, Tempe, Tucson
Convenience/Simplicity	**2**	Chandler, Flagstaff
Other Opportunities or Incentives	**8**	
Proximity to End-user	3	Eagar, Snowflake, Springerville
Planed Expansion of Program	2	Clarkdale, Glendale
Diversion of Sludge	1	Payson
Diversity of Recycling Opportunities	1	Tucson
Maintenance of Drop-off Site	1	Winslow

4. Cooperation and Partnerships

For the first time in two years, jurisdictions reported cooperation and partnerships as a major opportunity or incentive to recycle. The jurisdictions that reported this as an incentive cited both partnerships with other jurisdictions and partnerships with other governmental institutions as

motivators. This is an indication that cooperation between jurisdictions and other organizations is working and that this effort is beneficial to all the parties involved in the effort.

B. Impediments and Disincentives to Recycling

The impediments and disincentives fall into four main categories. These categories are: 1) financial impediments, 2) community attitudes and education, 3) lack of jurisdictional staff and 4) limited amounts or items accepted. Financial concerns are, by far, the most frequently identified impediments to recycling. A

complete list of the impediments and disincentives, as well as a list of the reporting jurisdictions, is given in Table 9.2.

1. Financial Impediments

Financial impediments were identified by 32 jurisdictions as the greatest impediment. Although this is consistent with the results from the past four years, the number of jurisdictions reporting financial impediments decreased from FY 1998. The top five financial concerns dealt with the economics of sustaining a recycling program. By far, the greatest impediment reported this fiscal year was the cost of programs and the lack of resources. Of the ten respondents that reported program cost and lack of resources as impediments, eight stated that they do not have jurisdiction operated recycling programs. Little or no revenues from recycling, transportation costs, the location and size of the jurisdiction and instability in the markets consistently have been reported as the greatest impediments. These are all legitimate issues that are difficult to overcome due to the geography of Arizona, current locations of recycling processors and end-users and the nature of recyclable materials markets.

2. Community Attitude and Education

Community attitudes and education were reported as the second most common impediment or disincentive to recycle for a second year in a row. This fiscal year, ten jurisdictions reported this as an impediment or disincentive, which was a decrease from the FY 1998 report. Apathy and lack of interest for recycling is still considered a large impediment throughout the state, that is consistent with past years. This fiscal year, however, jurisdictions cited that there was not enough recycling education in their community, that is a reversal from last year and would show that there is still much work that needs to be done in educating our citizens of the benefits of recycling. One jurisdiction stated an impediment to recycling in their community was a lack of a regional approach to recycling education. This is a valid issue, but hard to overcome, due to differences in each jurisdiction' s program. The affect of not having a regional approach is that the public is confused about what recyclable items are taken in their community' s program. This confusion can lead to a lack of participation or high levels of contamination in the jurisdiction' s recyclables stream.

3. Lack of Jurisdictional Staff

Lack of jurisdictional staff was, for the second year in a row, identified as a major impediment to recycling. This was, again, reported primarily by smaller jurisdictions. The staff members of these jurisdictions usually do not have the time or resources available to them to provide adequate, if any, recycling programs to their communities. A solution to this problem is to investigate developing partnerships with local businesses and service organizations as discussed in part A of this Section.

Table 9.2 Impediments and disincentives to recycling in Arizona as identified by local jurisdictions within the state. The number of jurisdictions identifying each impediment is given in the middle column. The jurisdictions identifying the impediment are given in the right column. Subcategories are given if several jurisdictions identify similar impediments or disincentive.

Impediment or Disincentive	Number	Jurisdictions
Financial	**32**	
Cost of Programs/Lack of Resources	10	Apache Junction, Cave Creek, Cottonwood, Eloy, Florence, Goodyear, Guadalupe, Parker, Sierra Vista, Tucson
Transportation Costs	5	Eagar, Mesa, Sierra Vista, Springerville, Tempe
Location of Markets/Jurisdiction	5	Cottonwood, Eagar, Florence, Parker, Springerville
Little/No Revenue for Jurisdiction	3	Apache Junction, Florence, Sierra Vista

Community Size/Volume of Materials	3	Eagar, Sierra Vista, Springerville
Prices/Market Fluctuations	2	Mesa, Sierra Vista
Markets for All Recyclables Not Available	2	Gilbert, Tempe
Competition with Private Haulers	1	Mesa
No Revenues for Citizens	1	Casa Grande
Community Attitudes/Education	**10**	
Lack of Interest/Apathy Towards Recycling	6	Bullhead City, Cave Creek, Coolidge, San Luis, Snowflake, Tolleson
Not Enough Education	3	Gilbert, Sedona, Winslow
No Regional Education Approach	1	Tempe
Lack of Jurisdictional Staff	**6**	Cave Creek, Chino Valley, Goodyear, San Luis, Snowflake, Winslow
Infrastructure and Logistical Problems	**4**	Clarkdale, Flagstaff, Payson, Sierra Vista
Limited Amounts/Items Accepted	**3**	Flagstaff, Tempe, Tucson
Other Impediments or Disincentives	**21**	
Lack of Multi-Jurisdictional Support	3	Eagar, Mesa, Springerville
Recycling Not Mandated	2	Goodyear, Sedona
No Single Hauler of Waste	2	Paradise Valley, Payson
Limited/No Drop-off Locations	2	Globe, Sedona
No Local End-user or Secondary Processor	2	Mesa, Tempe
Public Perception that Collection is Free	1	Tucson
Time to Separate Recyclables	1	Gilbert
No Commercial Opportunities to Recycle	1	Mesa
Do Not Offer Recycling to All Citizens	1	Chandler
Long Landfill Lifetime Expected	1	Tucson
Larger Refuse Container Promotes "Throw-Away" Mentality	1	Tucson
Lack of Service Provider for Commercial Generators	1	Chandler
Inconsistency with Other Local Recycling Programs	1	Tempe
Two Containers with Limited Space	1	Gilbert
Vector Inspection is Time Consuming	1	Tempe

Appendix A

ADEQ Recycling Program Grant-funded Resources

The following is a list of resources resulting from grant projects funded by the Arizona Department of Environmental Quality's Recycling Program. The listing has been provided in this format: Organization, Document Name, Publication Date, Title of Grant Project, Type of Grant Project and Document Type. To obtain copies of the resources listed below, you may call the Arizona Recycling Program at (602) 207-4134, or call toll free in Arizona at 1-(800)-234-5677 ext. 4134.

TECHNICAL REPORTS:

Advanced Environmental Systems, Inc. and Arizona Sheet Fabrication Inc., *Post Consumer Mixed Grade Thermoplastic Wood Substitute*, 1992, "Post Consumer Mixed Grade Thermoplastic Wood Substitute," Reduce, Reuse and Recycle Grant. Final grant report.

Arizona Clean and Beautiful/Gainer and Associates' Workshops, *Recycling Entrepreneurship in Arizona*, 1992, "Recycling Entrepreneurship in Arizona," Reduce, Reuse and Recycle Grant. Final grant report.

Arizona Organic Products, *Wood Waste Recovery Facility*, 1994, "Wood Waste Recovery Facility," Waste Reduction Assistance Grant. Grant report.

Atwell Salvage and Demolition Inc., *Construction Materials Recycling*, 1991, "Recycling of Construction Materials," Reduce, Reuse and Recycle Grant. Grant report.

Continental Circuits Corporation, *Circuit Board Scrap Recycling Project*, 1991, "Circuit Board Recycling Project," Reduce, Reuse and Recycle Grant. Final grant report.

EnviroSand, Inc., 1998, "Buy EnviroMill Machine," Waste Reduction Assistance Grant. Final grant report.

City of Flagstaff, *Commercial Waste Survey*, 1991, "Commercial Waste Audit and Pilot Recycling Program," Reduce, Reuse and Recycle Grant. Grant report.

City of Flagstaff, *Flagstaff Conservation Enrichment Units*, 1992, "City of Flagstaff Environmental Education," Reduce, Reuse and Recycle Grant. Final grant report.

Gila Ridge Pallet Company, 1998, "Pallet Waste Reduction Project," Waste Reduction Assistance Grant. Final grant report.

Growing Connections, Inc., *Teaching Reduce, Reuse, and Charity to School Children*, 1991, "Teaching Reduce, Reuse, and Charity to School Children," Reduce, Reuse and Recycle Grant. Final grant report.

Metallurgical and Biological Extraction Systems, Inc. (MBX), *Source Reduction and Recycling of Mine Waste Through Mineral Bioprocessing*, 1991, "Source Reduction and Recycling of Mine Waste Through Mineral Bioprocessing," Reduce, Reuse and Recycle Grant. Final grant report.

Metallurgical and Biological Extraction Systems, Inc. (MBX), *Removal and Reuse of Aluminum Dross*, 1991, "Removal and Reuse of Aluminum Dross," Reduce, Reuse and Recycle Grant. Final grant report.

Northern Arizona University, *NAU Recycles, Report and Guidelines*, 1991, "Northern Arizona University Campus Wide Aluminum Collection Buy-Back Center and Catalog Paper Recovery," Reduce, Reuse and Recycle Grant. Final grant report.

Norton Environmental, Inc., 1998, "Flagstaff Glass Pulverizing System," Waste Reduction Assistance Grant. Final grant report.

Phoenix Center for Community Development, *The Arizona Small Business Reduce, Reuse, Recycle Guide*, 1991, Reduce, Reuse and Recycle Grant. Final grant report.

Phoenix Metro Desert Compost (The Groundskeeper), *Phoenix Metropolitan Desert Compost Facility*, 1994, "Phoenix Metro Desert Compost (The Groundskeeper)," Waste Reduction Assistance Grant. Final grant report. Report and summary on the processing and marketing of the material produced by Phoenix Metro Desert Compost.

Pima County, Arizona, *Pima County, Arizona Compost Project*, 1993, "Pima County, Arizona Compost Project," Reduce, Reuse and Recycle Grant. Final grant report.

Pinal County Triple R Co-Op, *Triple R Co-Op Pinal County, Arizona*, 1991, "Pinal County Triple R Co-Op," Reduce, Reuse and Recycle Grant. Final grant report. Describes the establishment of a regional market development program.

Pinal County, Arizona Triple R Co-Op, *The Composting Workshop*, 1993, "The Composting Workshop," Reduce, Reuse and Recycle Grant. Grant report.

R & W Recycling (a.k.a. New World Recycling), *The Old Corrugated Cardboard Recovery Project*, 1994, Waste Reduction Assistance Grant. Grant report.

Recycling Industries, Inc., *Development and Issues and Feasibility Analysis for Recycling Industries, Inc. of Phoenix, Arizona*, 1992, "Freon Removal From Discarded Appliances," Reduce, Reuse and Recycle Grant. Grant report.

SASCO Products Inc., *Research for the Development of a Reuse, and Recycling Protocol for Discarded Appliances (White Goods)*, 1991, "Development of a Reuse and Recycling Protocol for Discarded Appliances," Reduce, Reuse and Recycle Grant. Grant report.

Santa Cruz County/City of Nogales, *Material Recovery Facility Feasibility Study*, 1991, "Santa Cruz/Nogales MRF Study and Recycling Project," Reduce, Reuse and Recycle Grant. Grant report.

Sedona Recycles, Inc., *Sedona Recycles, Inc. - Community Recycling Center*, 1994, "Sedona Recycles, Inc.," Waste Reduction Assistance Grant. Final grant report. Photos showing recycling facility throughout construction process and graph indicating pounds of material recycled.

Southwest Public Recycling Association, *Southwest Public Recycling Association Market Development Program for the Southwest Region*, 1991, "Southwest Public Recycling Association Market Development Program for the Southwest Region," Reduce, Reuse and Recycle Grant. Grant report.

Southwest Public Recycling Association, *Attachment B, Arizona Cooperative Marketing Photo Journal, SPRA Second Quarter Report*, 1993, "Southwest Public Recycling Association, Attachment B, Arizona Cooperative Marketing Photo Journal," Reduce, Reuse and Recycle Grant. Grant report. (slides)

City of Tucson, *A Model for a Comprehensive Waste Reduction Procurement Program - Technical Guide for Purchasing Officials*, 1991, "City of Tucson Comprehensive Waste Reduction Model," Reduce, Reuse and Recycle Grant. Guidebook.

Tucson Organic Gardeners, *Home Composting Education Program*, 1991, "Tucson Organic Gardener's Home Composting Program," Reduce, Reuse and Recycle Grant. Grant report.

University of Arizona, *The Characterization of Commercial Solid Waste in Tucson, Arizona*, 1991, "University of Arizona Commercial Solid Waste Characterization of the Tucson Metropolitan Area," Reduce, Reuse and Recycle Grant. Final grant report.

University of Arizona, *A Characterization of the Solid Wastes of City of Tucson Governmental Agencies*, 1993, "A Characterization of the Solid Wastes of City of Tucson Governmental Agencies," Reduce, Reuse and Recycle Grant. Grant report.

BROCHURES/PAMPHLETS:

Agua Fria-New River Natural Resource Conservation District, 1997, "The Earthworm Tunnel," Waste Reduction Initiative Through Education Grant. A walk-through tunnel that demonstrates composting of household organic wastes through worm composting. The Earthworm Tunnel demonstration project is located at Duncan Family Farms in Litchfield, Arizona. Composting curriculum developed as a supplement.

Environmental Education Exchange, *Mission 3R-A Challenge for Change, An Interactive Exploration into the World of Solid Waste and Recycling*, 1995, Waste Reduction

Initiative Through Education Grant. Software program, teacher's guide and promotional brochure on interactive software program.

City of Flagstaff, June 1999, "Ready for Recycling," Waste Reduction Initiative Through Education Grant. Recycling Education Campaign; brochures, posters, and magnets.

City of Scottsdale, Brochure Series, 1995, Waste Reduction Initiative Through Education Grant. A series of four brochure templates that provide waste reduction, recycling, household hazardous waste and environmental shopping information. To be applied in any community. (Spanish & English version available)

Southwest Public Recycling Association, *Leaving Your Hazardous Waste…*, June 1999, "Household Hazardous Waste Education Brochure," Waste Reduction Initiative Through Education Grant. Copies of brochure available. Brochure negative available for printing.

Tuba City Family Wellness Center, June 1999, "The Protective Circle Project," Waste Reduction Initiative Through Education Grant. Recycling Education Program for Coconino County, including Western Navajo Nation. Copies of brochure available.

Tucson Clean and Beautiful, 1997, "Tucson/Pima County Waste Reduction Education Display and Brochures," Waste Reduction Initiative Through Education Grant. Display board and brochures that describe waste reduction techniques for the Pima County area. Display located at Tucson Clean and Beautiful.

GUIDEBOOKS/HOW-TO MANUALS/RECYCLING CURRICULA:

Architectural Landscaping, Inc., 1991, Reduce, Reuse and Recycle Grant. Description of designing, building and operating a desert composting facility for municipal yard waste. Reference document.

Arizona Filter Recyclers, 1994, Waste Reduction Assistance Grant. Project established centralized collection site for used oil and filters. Reference document.

Arizona Hotel/Motel Association, *Inn-Keeping with the Environment: A Waste Reduction Guidebook for the Arizona Lodging Industry*, 1997, "Waste Reduction Education Campaign for the Hospitality Industry," Waste Reduction Initiative Through Education Grant. Guidebook and workshop presentation.

Arkay Enterprises, 1997, "Winner's Circle Soils, Inc.," Waste Reduction Assistance Grant. Description of process to turn industrial wood waste and greenwaste into mulch products.

Cochise County and University of Arizona, *Pilot Composting of Yard Wastes at Seven Sites in Cochise County*, 1991, "Cochise County Pilot Composting of Yard Waste," Reduce, Reuse and Recycle Grant. Guidebook.

Cocopai County, 1995, "Cocopai Rural Recycling Workshop", Waste Reduction Initiative Through Education Grant. Recycling workshop and information.

Cottonwood-Verde Valley Recycles, 1997, "Educational and Informational Outreach on Recycling and Waste Reduction to Residents, Schools, and Businesses of the Verde Valley," Waste Reduction Initiative Through Education Grant. Community education program and curriculum for grades K-8.

Environmental Concerns Organization, Inc., 1997, "Recycling Association of Maricopa," Waste Reduction Assistance Grant. Guidebook to starting a recycling program and education program. Final grant report.

Environmental Concerns Organization, Inc., June 1999, "Maricopa Education Project," Waste Reduction Initiative Through Education Grant. Curriculum packet for K-3. Education materials available in English and Spanish for adult community.

Environmental Education Exchange, *Mission 3R-A Challenge for Change, An Interactive Exploration into the World of Solid Waste and Recycling*, 1995, Waste Reduction Initiative Through Education Grant. Software program, teacher's guide and promotional brochure on interactive software program.

City of Flagstaff, 1997, "The Salvage Source, Phase 1," Waste Reduction Assistance Grant. A program that will recover leftover/overrun construction and demolition material to be auctioned later. Reference document.

Gila County Solid Waste Department, 1997, "Gila County Recycle Grant," Waste Reduction Initiative Through Education Grant. Description and slide presentation of a landfill and how it is operated, along with a fact sheet and information regarding recycling activity in the county. Designed for grades K-12.

Town of Gilbert, 1997, "Recycling Education Pilot Program," Waste Reduction Initiative Through Education Grant. Coloring/activity books for pre-school and elementary level students.

KrushKo Masonry Recycling Pilot Project (Western Block Co.), 1994, Waste Reduction Assistance Grant. Project established to demonstrate the recycling of broken blocks and concrete waste. Reference document.

Lonepine Cooperative Marketing Seminar, 1995, Waste Reduction Initiative Through Education Grant. Recycling seminar and information.

Maricopa Association of Governments, 1998, "Regional Recycling Information Exchange," Waste Reduction Assistance Grant. Recycling information. Final grant report.

Northland Pioneer College, 1991, "Cooperative Paper Project," Reduce, Reuse and Recycle Grant. Expanded office paper recycling program to city and county offices. Reference document.

Organic Products Committee, of the Arizona Recycling Coalition, *Compost Resource Guidebook*, April 1998, Waste Reduction Initiative Through Education Grant. Guidebook.

Organic Products Committee, of the Arizona Recycling Coalition, 1995, "Composting Arizona Style," Waste Reduction Initiative Through Education Grant. Composting workshop.

City of Phoenix, *Book Reuse Project - A How-To Manual*, 1991, "Book Bag Reuse Project," Reduce, Reuse and Recycle Grant. Grant report and guidebook.

City of Phoenix, June 1999, "Household Hazardous Waste Program," Waste Reduction Initiative Through Education Grant. Household Hazardous Waste Education Program through mascot presentations and classroom presentations for elementary and middle school. Activity Book.

R. W. Beck and Associates, *Source Reduction and Recycling Programs: An Integrated Approach*, 1991, "R.W. Beck and Associates Source Reduction/Recycling Workshop," Reduce, Reuse and Recycle Grant. Guidebook.

River Cities Waste Service, Lake Havasu, 1998, "Boy Scouts Newspaper Drop-off," Waste Reduction Assistance Grant. Final grant report.

Tuba City Family Wellness Center, June 1999, "The Protective Circle Project," Waste Reduction Initiative Through Education Grant. Recycling Education Curriculum for K-12.

City of Tucson, *Ravin' About Recycling* Campaign, 1997, Waste Reduction Initiative Through Education Grant. City of Tucson Recycling Education Campaign Documents include-Master Recycler Program Training Manual, Slides of Master Recycler training, composting and recycling information brochures, and waste reduction and recycling resource listing for small businesses.

Tucson Iron and Metal, 1998, "Paper and Plastic Recycling Program," Waste Reduction Assistance Grant. Final grant report.

Tucson Organic Gardeners, 1995, Waste Reduction Initiative Through Education Grant. Compost education school program.

University of Arizona, *Waste Reduction Alternatives Programs (WRAP) Resource Manual* and *Action Plan for the Tucson Unified School District*, 1992, "University of Arizona (WRAP)," Reduce, Reuse and Recycle Grant. Guidebook.

VMB Enterprises, 1997, "Grant Training Seminars," Waste Reduction Initiative Through

Education Grant. Guidance for improving proposal writing.

Western Organics Inc., 1994, Waste Reduction Assistance Grant. Project to expand and upgrade biosolid (sludge) compost facility. Reference document.

White Mountain Recycling Project, 1991, Reduce, Reuse and Recycle Grant. Demonstration project of centralized recycling collection site and facility. Reference document.

City of Williams, 1998, "Commercial and Residential Trash Containers/Curbside Recycling," Waste Reduction Assistance Grant. Project to purchase recycle bins for community.

VIDEO TAPES:

Alliance Marketing Southwest, 1997, "Resell, Reuse, Recycle," Waste Reduction Assistance Grant. Description of program to resell, donate and recycle used textbooks. Appeals to teachers, educators and school officials.

TV PSAs, Arizona Broadcasters Association, 1995, "Reduce, Reuse and Recycle," Waste Reduction Initiative Through Education Grant. PSAs on paper, glass, plastic and aluminum can recycling. Appeals to all ages.

TV PSAs, Arizona Clean and Beautiful, 1998, "Influence Behavior Public Service Announcements," Waste Reduction Initiative Through Education Grant Cowboy Camp out (:30) - cowboys sitting around campfire discussing advantages of recycling to one cowboy who does not recycle; Little Boy Recycling with Neighbors (:30) - little boy recycling newspapers with neighbors and asks his father why everyone doesn' t recycle; Tom Chambers Basketball Scene (:30) - friends watching basketball game on TV, Tom Chambers promotes the advantages of recycling to one friend who does not recycle. Humorous description of community involvement with recycling. Appeals to all ages. (3 copies)

City of Flagstaff Clean and Green, 1992, "Waste Reduction for Small Business," Reduce, Reuse and Recycle Grant. Waste reduction and recycling tips for small businesses. Appeals to small business owners. (14:52) (3 copies)

City of Flagstaff, June 1999, "Ready for Recycling," Waste Reduction Initiative Through Education Grant. Program information on how to recycle in Flagstaff. (15 minutes) (1 copy), 3 television advertisements at (:30) each, (1 copy)

Mesa High School, 1995, "Project Earthship 1996-1997," Waste Reduction Initiative Through Education Grant. Information about Mesa High School Project Earthship. Demonstrates start-up and construction process. Appeals to high school students and educators.

Phoenix Clean and Beautiful, 1997, "The Valley Shares," Waste Reduction Assistance Grant.

Information on how individuals, businesses and organizations can help recycling by donating office equipment, supplies, etc. to The Valley Shares program. Also it explains how non-profit/charitable organizations can benefit by using their program to obtain office equipment, etc. Appeals to businesses, educators, charitable organizations and adults.

Tuba City Family Wellness Center, June 1999, "The Protective Circle Project," Waste Reduction Initiative Through Education Grant. Recycling Education Program for Coconino County, including Western Navajo Nation. Video geared for local community.

City of Tucson, "ReThink It Pilot Project."
Program description and operation information. 1994. Appeals to adults. (4:23)

TV PSAs, City of Tucson, 1998, "Ravin' About Recycling," Waste Reduction Initiative Through Education Grant. City of Tucson Recycling Education Campaign documents-campaign binder, Master Recycler Program Training Manual, Slides of Master Recycler training, composting and recycling information brochures and waste reduction and recycling resource list for small businesses. Appeals to all ages. (4 PSAs, 1 in Spanish)

Tucson Organic Gardeners, 1991, "Home Composting in the Desert," Reduce, Reuse and Recycle Grant. Information guide to backyard composting of yard trimmings and kitchen wastes. Appeals to all ages and educators. (3 copies, 1 in Spanish)

SLIDES:

Gila County, 1998, Waste Reduction Initiative Through Education Grant. Slide presentation of landfill in Payson, Arizona. Recycling education program for county schools and the general public.

City of Tucson, 1998, "Ravin' About Recycling," Waste Reduction Initiative Through Education Grant. City of Tucson Recycling Education Campaign documents-campaign binder, Master Recycler Program Training Manual, Slides of Master Recycler training, composting and recycling information brochures and waste reduction and recycling resource list for small businesses. Appeals to all ages.

AUDIO TAPES:

Radio PSAs, Cottonwood-Verde Valley Recycles, 1998, "Compost and Recycling Program," Waste Reduction Assistance Grant. PSAs for recycling in Cottonwood/Verde Valley area - "Fairy Mulch Mother," "Recycling Rap" and "Sounds of Recycling." (4 copies)

Radio PSAs, Cottonwood-Verde Valley Recycles, 1998, "Compost and Recycling Program," Waste Reduction Assistance Grant. PSAs for recycling in Cottonwood/Verde Valley area - "Fairy Mulch Mother" only.

Radio PSAs, City of Flagstaff, June 1999, "Ready for Recycling," Waste Reduction Initiative Through Education Grant. Radio Public Service Advertisements.

Radio PSAs, Starr Communications, June 1999, "Radio Public Service Advertisements Campaign," Waste Reduction Initiative Through Education Grant. Cassettes and compact disks are available for copying.

SOFTWARE PROGRAM:

Environmental Education Exchange, 1995, "Mission 3R - A Challenge for Change," Waste Reduction Initiative Through Education Grant. Interactive software program for elementary and middle-school students, teachers and youth workers. Software program, teacher's guide and promotional brochure. Appeals to children ages 6-14, teachers, educators and adults. (PC and Mac version available)

OTHER RESOURCES:

Arizona State Recycling Emblem, 1994 trademark. Emblem can be used by any Arizona organization for use in promoting recycling and waste reduction efforts. To obtain an electronic or hard copy version, please call (602) 207-4865.

Arizona State University, *The Arizona Recycling Review Newsletter*, 1991, Reduce, Reuse and Recycle Grant. Quarterly newsletters on solid waste reduction and recycling awareness projects in Arizona. Contract agreement from 1992 through 1999. Selected Volumes 1992-1999 available.

Arizona Waste Exchange, 1992, Reduce, Reuse and Recycle Grant. An electronic catalogue designed to bring waste generators and potential users of this waste together.

Tuba City Family Wellness Center, June 1999, "The Protective Circle Project," Waste Reduction Initiative Through Education Grant. Recycling Education Program for Coconino County, including Western Navajo Nation.

Appendix B

Tons of Waste Disposed at Solid Waste Landfills in Arizona From April 1998 Through March 1999 As Reported to ADEQ

NAME	TYPE[1]	COUNTY	OPERATION STATUS	TIPPING FEE[2]	TOTAL TONS LANDFILLED[3]
Abitibi Consolidated - Snowflake	ISWLF	Navajo	Active	NA	29,953.00
Allied Waste - Apache Junction	MSWLF	Pinal	Active	$10.50/yd^3	80,417.00
Allied Waste - Lake Havasu City	MSWLF	Mohave	Active	$10.00/yd^3	58,974.44
Allied Waste - Queen Creek	MSWLF	Maricopa	Active	$21.00/ton	162,843.87
Allied Waste - Southwest Regional	MSWLF	Maricopa	Active	$20.00/ton	286,035.40
Apache County - Blue Hills Regional	MSWLF	Apache	Active	$25.00/ton	36,688.36
AEPCO - Apache Power Generating Station	ISWLF	Apache	Active	NA	143.92
Arizona State Prison - Fort Grant	MSWLF	Mohave	Inactive	$0.00/tons	0.00
Arizona Strip	MSWLF	Mohave	Active	Unknown	4,249.19
ASARCO Ray Complex - Hayden Concentrator	ISWLF	Pima	Active	NA	4,497.53
ASARCO Ray Complex - Hayden Smelter	ISWLF	Pima	Active	NA	9,453.59
ASARCO Ray Complex - Ray Mine	ISWLF	Pima	Active	NA	5,095.16
BHP - Copper	ISWLF	Gila	Active	NA	236.84
Bradley Investment - 40th Street	CDLF	Maricopa	Inactive	Unknown	0.00
Calmat - Litchfield/Avondale	CDLF	Maricopa	Active	Unknown	89,355.92
(City of) Casa Grande - Casa Grande	MSWLF	Pinal	Active	$12.00/ton	58,724.08
(City of) Chandler - McQueen	MSWLF	Maricopa	Active	$28.40/ton	86,282.00
Cochise County - Elfrida/Eastern Regional	MSWLF	Cochise	Active	$39.00/ton	61,239.92
Cocopah Nation - Somerton - Yuma Billing	MSWLF	Yuma	Closed	$10.99/ton	0.00

1 MSWLF represents municipal solid waste landfill; CDLF represents construction debris landfill; ISWLF represents industrial solid waste landfill.

2 Tipping fee figures are from *Solid Waste Digest: Western Edition;* Chartwell Information Publishers, Volume 8, number 6, July 1999.

3 Tonnage was determined using payments received from landfill owners of $0.25/ton. Missing payments were estimated by comparing payments from other quarters of FY 1999 to equivalent quarters from past years.

NAME	TYPE	COUNTY	OPERATION STATUS	TIPPING FEE	TOTAL TONS LANDFILLED
(City of) Colorado City - Colorado City	MSWLF	Mohave	Closed	Unknown	0.00
(City of) Eloy - Eloy	MSWLF	Pinal	Active	$20.00/ton	25,627.96
(City of) Flagstaff - Cinder Lake	MSWLF	Coconino	Active	$30.25/ton	141,504.84
Gambi Disposal - Cerbat	MSWLF	Mohave	Active	$28.15/ton	47,759.20
Gila County - Buckhead Mesa/Payson	MSWLF	Gila	Active	$22.00/ton	32,683.00
Gila County - Russell Gulch/Globe	MSWLF	Gila	Active	$22.00/ton	22,627.00
(City of) Glendale - Glendale	MSWLF	Maricopa	Active	$26.25/ton	307,361.64
Glenn Weinberger - Rainbow Valley	CDLF	Maricopa	Active	Unknown	84,255.60
Graham County - Graham County Regional	MSWLF	Graham	Active	$0.00/ton	28,868.00
Grand Canyon South Rim National Park	MSWLF	Coconino	Active	$0.00/ton	2,044.08
Greenlee County - Blue	MSWLF	Greenlee	Active	$0.00/ton	224.00
Greenlee County - Loma Linda	MSWLF	Greenlee	Active	$0.00/ton	8,744.96
Greenlee County - South County	MSWLF	Greenlee	Closed	$0.00/ton	300.00
(City of) Holbrook - Holbrook South	MSWLF	Navajo	Closed	Unknown	0.00
(City of) Huachuca City - Huachuca City	MSWLF	Cochise	Active	$35.00/ton	32,916.56
La Paz County - La Paz County	MSWLF	La Paz	Active	$20.00/ton	59,188.24
Maricopa County - Cave Creek	MSWLF	Maricopa	Active	Unknown	146,839.00
Maricopa County - Hassayampa	MSWLF	Maricopa	Closed	Unknown	0.00
Mohave County - Mohave Valley	MSWLF	Mohave	Active	$26.15/ton	55,405.80
(City of) Page - Page	MSWLF	Coconino	Inactive	Unknown	0.00
(Town of) Patagonia - Patagonia	MSWLF	Santa Cruz	Active	$10.50/yd^3	994.56
(City of) Phoenix - Skunk Creek	MSWLF	Maricopa	Active	$22.25/ton	790,205.80
Pima County - Ajo	MSWLF	Pima	Active	$23.50/ton	3,321.92
Pima County - Ina Road	CDLF	Pima	Active	Unknown	19,977.28
Pima County - Sahuarita	MSWLF	Pima	Active	Unknown	30,505.12
Pima County - Tangerine Road	MSWLF	Pima	Active	$23.50/ton	70,004.00
(City of) Prescott - Sundog Ranch Road	MSWLF	Yavapai	Inactive	Unknown	0.00
Resource Recovery Trust - Speedway	CDLF	Pima	Active	Unknown	51,737.00
Salt River Indian Tribe - Gilbert Billing	MSWLF	Maricopa	Active	$30.00/ton	54,958.20
Salt River Indian Tribe - Mesa Billing	MSWLF	Maricopa	Active	$30.00/ton	212,960.00

Salt River Indian Tribe - Tempe Billing	MSWLF	Maricopa	Active	$30.00/ton	143,036.96
NAME	**TYPE**	**COUNTY**	**OPERATION STATUS**	**TIPPING FEE**	**TOTAL TONS LANDFILLED**
SRP - Coronado Generating Station	ISWLF	Apache	Active	NA	0.00
Santa Cruz County - Rio Rico	MSWLF	Santa Cruz	Active	$23.00/ton	37,860.00
Santa Cruz County - Sonoita/Elgin	MSWLF	Santa Cruz	Active	$23.00/ton	1,144.00
(City of) Tucson - Harrison Road	MSWLF	Pima	Closed	Unknown	0.00
(City of) Tucson - Los Reales	MSWLF	Pima	Active	$22.00/ton	427,338.00
TEP - Springerville Generating Station	ISWLF	Apache	Inactive	NA	0.00
Waste Management - Adamsville	MSWLF	Pinal	Active	$9.50/yd^3	123,403.40
Waste Management - Butterfield Station	MSWLF	Maricopa	Active	$18.25/ton	882,264.12
Waste Management - Copper Mountain	MSWLF	Yuma	Active	$10.99/ton	375,143.68
Waste Management - Dudleyville	MSWLF	Pinal	Active	$9.50/yd^3	17,703.40
Waste Management - Grey Wolf	MSWLF	Yavapai	Active	$29.34/ton	162,672.28
Waste Management - Lone Cactus	CDLF	Maricopa	Active	Unknown	162,943.92
Waste Management - Northwest Regional	MSWLF	Maricopa	Active	$20.50/ton	485,169.72
Waste Management - Pen Rob	MSWLF	Navajo	Active	$5.50/yd^3	84,376.52
Waste Management - Sierra Estrella	MSWLF	Pinal	Active	$16.25/ton	74,407.88
(Town of) Wickenburg - Wickenburg	MSWLF	Maricopa	Closed	$0.00/ton	0.00
Yavapai County - Black Canyon City	MSWLF	Yavapai	Closed	Unknown	0.00
Yavapai County - Camp Verde	MSWLF	Yavapai	Inactive	Unknown	0.00
Yavapai County - Seligman	MSWLF	Yavapai	Closed	Unknown	0.00
(City of) Yuma - Yuma	MSWLF	Yuma	Active	Unknown	6,383.00
Total					6,189,050.86

Appendix C

Grants Projects that have been funded by the State Recycling Program since its inception in 1990.

Organization	Project	Grant[1]	Year	Funding	City	County	Type
Advanced Environmental Systems	Plastics Research and Development	RRR	1991	$30,000.00	Phoenix	Maricopa	Private
Architectural Landscaping, Inc.	Desert Composting Facility	RRR	1991	$62,700.00	Tucson	Pima	Private
ASU Center for Environmental Design	Recycling Newsletter	RRR	1991	$28,000.00	Tempe	Maricopa	University
Atwell Salvage and Demolition, Inc.	C and D Recycling	RRR	1991	$23,000.00	Phoenix	Maricopa	Private
Cochise County	County-wide R and D Composting Strategies	RRR	1991	$65,349.00	Bisbee	Cochise	Public
Continental Circuits Corporation	Circuit Board Recycling	RRR	1991	$49,000.00	Phoenix	Maricopa	Private
City of Cottonwood	Yard Waste Recycling	RRR	1991	$20,000.00	Cottonwood	Yavapai	Public
City of Flagstaff	Hospitality Industry Waste Audit	RRR	1991	$6,941.00	Flagstaff	Coconino	Public
Growing Connections	Reuse Education in Schools	RRR	1991	$17,254.00	Flagstaff	Coconino	Non-profit
MBX	Source Reduction	RRR	1991	$36,000.00	Tucson	Pima	Private
MBX	Aluminum Dross	RRR	1991	$36,500.00	Tucson	Pima	Private
City of Nogales and Santa Cruz County	MRF Study and Recycling Project	RRR	1991	$65,000.00	Nogales	Santa Cruz	Public
Northland Pioneer College	Office Paper Recycling Expansion	RRR	1991	$25,485.00	Holbrook	Navajo	University
Northern Arizona University	University Recycling Program	RRR	1991	$7,431.00	Flagstaff	Coconino	University
Phoenix Center for Community Development	Waste Reduction for Small Business	RRR	1991	$59,100.00	Phoenix	Maricopa	Non-profit

[1] RRR represents the Reduce, Reuse, Recycle Grant Program; WRE represents the Waste Reduction Education Grant Program; WRA represents the Waste Reduction Assistance Grant Program; WRITE represents the Waste Reduction Initiative Through Education Grant Program; HHW represents the Household Hazardous Waste Grant Program; SWRA represents the Small Community Waste Reduction Assistance Grant Program; and R & D represents the Waste Reduction Assistance Research and Development Grant Program.

City of Phoenix	Book Reuse	RRR	1991	$25,000.00	Phoenix	Maricopa	Public
Organization	**Project**	**Grant**	**Year**	**Funding**	**City**	**County**	**Type**
Pinal County	Solid Waste Management Strategy	RRR	1991	$56,547.00	Florence	Pinal	Public
R. W. Beck and Associates	Source Reduction and Recycling Workshops	RRR	1991	$23,000.00	Phoenix	Maricopa	Private
CURE (Sam Hughes Neighborhood Project	Drop-offs and Composting	RRR	1991	$3,390.00	Tucson	Pima	Non-profit
SASCO	White Goods Recycling	RRR	1991	$23,345.00	Tucson	Pima	Private
Southwest Public Recycling Association	Cooperative Marketing of Recyclables	RRR	1991	$25,000.00	Tucson	Pima	Non-profit
City of Tucson	Comprehensive Waste Education Model	RRR	1991	$70,368.00	Tucson	Pima	Public
Tucson Metropolitan Ministries	Construction Material Reuse	RRR	1991	$47,000.00	Tucson	Pima	Non-profit
Tucson Organic Gardeners	Backyard Composting Demonstration	RRR	1991	$15,250.00	Tucson	Pima	Non-profit
University of Arizona	Commercial Solid Waste Characterization	RRR	1991	$35,742.00	Tucson	Pima	University
White Mountain Recycling	Recycling Center	RRR	1991	$11,000.00	Springerville	Apache	Non-profit
Advance Environmental Systems	Thermoplastic Wood Substitute	RRR	1992	$30,000.00	Phoenix	Maricopa	Private
Arizona Clean and Beautiful	Recycling Workshops	RRR	1992	$27,740.00	Phoenix	Maricopa	Non-profit
Arizona Recycling Coalition	Workshops and Publicity	RRR	1992	$15,427.00	Phoenix	Maricopa	Non-profit
Arizona Waste Exchange	Waste Exchange	RRR	1992	$35,000.00	Tucson	Pima	Private
Blue Hills Environmental Associates	Mobile Used Oil Collection	RRR	1992	$3,012.00	St. Johns	Apache	Private
Coalition of United Recycling Efforts	Source Reduction for School Children	RRR	1992	$8,870.00	Tucson	Pima	Private
Cochise County	Household Hazardous Waste	RRR	1992	$19,800.00	Bisbee	Cochise	Public
City of Flagstaff	Resource Center for Environmental Education	RRR	1992	$9,786.00	Flagstaff	Coconino	Public
City of Flagstaff	Flagstaff Clean and Green	RRR	1992	$15,950.00	Flagstaff	Coconino	Public
Fort Howard Corporation	Paper Mill Feasibility Project	RRR	1992	$70,000.00	Green Bay	Yuma	Private
Friedman Recycling Company	Glass Recycling Project	RRR	1992	$60,000.00	Phoenix	Maricopa	Private
City of Glendale	Multi-family Drop-off Recycling	RRR	1992	$9,540.00	Glendale	Maricopa	Public
Recycling Industries	Mobile Appliance Recycling	RRR	1992	$38,000.00	Phoenix	Maricopa	Private

Organization	Project	Grant	Year	Funding	City	County	Type
Santa Cruz County; Town of Patagonia	Mobile Recycling Project	RRR	1992	$17,355.00	Nogales	Santa Cruz	Public
Southwest Public Recycling Association	Cooperative marketing Project	RRR	1992	$74,540.00	Tucson	Pima	Non-profit
Tucson Metropolitan Ministry	Construction Material Reuse	RRR	1992	$40,000.00	Tucson	Pima	Non-profit
University of Arizona	School Waste Stream Characterization	RRR	1992	$40,000.00	Tucson	Pima	University
Waste Not Warehouse	Durable Goods Reuse	RRR	1992	$20,000.00	Tucson	Pima	Non-profit
Why Waste America	Plastics Processing Facility	RRR	1992	$55,000.00	Phoenix	Maricopa	Private
Yuma WORC Center, Incorporated	Recycling Facility	RRR	1992	$50,000.00	Yuma	Yuma	Non-profit
Apache Junction Clean and Beautiful	Waste Control Newsletter	WRE	1993	$548.12	Apache Junction	Pinal	Non-profit
Blue Hills Environmental Associates	Changing Attitudes about Solid Waste	WRE	1993	$4,599. 73	St. Johns	Apache	Private
City of Chandler	Backyard Composting Program	WRE	1993	$1,299.00	Chandler	Maricopa	Public
City of Flagstaff	Science Kit Curriculum Revision	WRE	1993	$1,388.61	Flagstaff	Coconino	Public
City of Mesa	Recycling Publicity Materials	WRE	1993	$8,723.82	Mesa	Maricopa	Public
City of Peoria	1992 Waste Reduction Education Grant	WRE	1993	$1,532.80	Peoria	Maricopa	Public
City of Phoenix	Facility Education Program	WRE	1993	$29,779.08	Phoenix	Maricopa	Public
City of Sierra Vista	Household Hazardous Waste Program	WRE	1993	$748.78	Sierra Vista	Cochise	Public
City of Tempe	Composting in the Desert	WRE	1993	$4,295.92	Tempe	Maricopa	Public
Cochise County	Master Recyclers	WRE	1993	$5,207.38	Bisbee	Cochise	Public
Growing Connections	Teaching Concepts of Waste Reduction and Charity	WRE	1993	$2,500.00	Tucson	Pima	Non-profit
La Paz County	Master Recyclers	WRE	1993	$3,419.25	Parker	La Paz	Non-profit
Navajo County	Cooperative Paper Project	WRE	1993	$5,103.67	Holbrook	Navajo	Public
Pinal County	Composting Workshop	WRE	1993	$4,686.76	Florence	Pinal	Public
SW Environmental Education Exchange	Waste Reduction Education Program	WRE	1993	$9,797.97	Tucson	Pima	Non-profit
Tucson Organic Growers	home Composting Education Program	WRE	1993	$1,800.00	Tucson	Pima	Non-profit
Tucson Children' s Museum	Environmental Education Program	WRE	1993	$2,900.00	Tucson	Pima	Non-profit

Organization	Project	Grant	Year	Funding	City	County	Type
Arizona Filter Recyclers	Used Oil Filter Recycling	WRA	1994	$55,000.00	Phoenix	Maricopa	Private
Arizona Organic Products	Wood Waste Recovery Facility	WRA	1994	$65,000.00	Tucson	Pima	Private
Catalina Sunshine, Inc.	Recycling Truck	WRA	1994	$35,000.00	Tucson	Pima	Private
Environmental Earthscapes, Inc.	Commercial Composting Facility in Phoenix	WRA	1994	$50,000.00	Phoenix	Maricopa	Private
Krushco Masonry Recycling Pilot Project	Concrete Waste Recycling Project	WRA	1994	$60,000.00	Phoenix	Maricopa	Private
R and W Recycling; New World Recycling	Commercial Cardboard Recycling	WRA	1994	$17,282.00	Flagstaff	Coconino	Private
Sedona Recycles, Inc.	Building Permanent Recycling Facility	WRA	1994	$60,000.00	Sedona	Yavapai	Non-profit
Western Organics, Inc	Biosolids Composting Expansion	WRA	1994	$55,000.00	Phoenix	Maricopa	Private
Yuma WORC Center, Inc.	Recycling Operation Expansion	WRA	1994	$50,000.00	Yuma	Yuma	Non-profit
Arizona Broadcasters Association	Mass Media Public Service Announcements	WRITE	1995	$55,000.00	Phoenix	Maricopa	Private
AzRC/Organic Products Committee	Composting Workshop	WRITE	1995	$5,000.00	Phoenix	Maricopa	Non-profit
Cayetano Consulting (Provisional award)	Santa Cruz County WRITE	WRITE	1995	$32,300.00	Tucson	Pima	Non-profit
City of Flagstaff	Expanded Environmental Education	WRITE	1995	$16,304.00	Flagstaff	Coconino	Public
City of Scottsdale	Comprehensive Information Packets	WRITE	1995	$7,500.00	Scottsdale	Maricopa	Public
Cocopai RCDA	Rural Recycling Workshop	WRITE	1995	$4,000.00	Flagstaff	Coconino	Non-profit
Environmental Education Exchange	Mission #R Interactive Computer Program	WRITE	1995	$39,858.00	Tucson	Coconino	Non-profit
Lone Pine LGFC	Cooperative marketing Seminar	WRITE	1995	$2,389.00	Pinetop-Lakeside	Navajo	Public
Mesa High School	Earthship	WRITE	1995	$20,000.00	Mesa	Maricopa	Public
Phoenix Clean and Beautiful	Small Business Recycling Workshops	WRITE	1995	$5,118.00	Phoenix	Maricopa	Non-profit
Southwest Public Recycling Association	Buy Recycled Expo	WRITE	1995	$15,000.00	Tucson	Pima	Non-profit
Tucson Organic Gardeners	Compost Education Program	WRITE	1995	$8,003.00	Tucson	Pima	Non-profit
City of Glendale	Expansion of HHW Program	HHW	1996	$37,900.00	Glendale	Maricopa	Public
City of Holbrook	First HHW Collection Day	HHW	1996	$12,000.00	Holbrook	Navajo	Public
City of Mesa	Multi-jurisdictional HHW Collection	HHW	1996	$100,000.00	Mesa	Maricopa	Public

Organization	Project	Grant	Year	Funding	City	County	Type
City of Peoria	Mobile HHW Collection Program	HHW	1996	$82,600.00	Peoria	Maricopa	Public
City of Phoenix	BOPA Collections	HHW	1996	$145,000.00	Phoenix	Maricopa	Public
City of Tempe	Permanent HHW Facility	HHW	1996	$300,000.00	Tempe	Maricopa	Public
Mohave County	Multi-jurisdictional HHW Collection	HHW	1996	$80,000.00	Kingman	Mohave	Public
Pima County	Regional HHW Collection Facility	HHW	1996	$388,764.00	Tucson	Pima	Public
Pinal County	Permanent Collection Facility	HHW	1996	$55,433.00	Florence	Pinal	Public
Yuma County	HHW Collection Events	HHW	1996	$16,280.00	Yuma	Yuma	Public
Alliance Marketing Southwest	Program Expansion	WRA	1996	$64,418.00	Mesa	Maricopa	Private
Boricel Corporation	Cellulose Insulation Batt - Kraft Laminator	WRA	1996	$66,000.00	Chandler	Maricopa	Private
City of Flagstaff	The Salvage Source, Phase 1	WRA	1996	$9,000.00	Flagstaff	Coconino	Public
City of Mesa	Green Waste Barrel Pilot	WRA	1996	$75,000.00	Mesa	Maricopa	Public
City of Scottsdale	Library Book Binding Cutter and Recycling Project	WRA	1996	$4,600.00	Scottsdale	Maricopa	Public
City of Yuma	City of Yuma Recycling Program	WRA	1996	$22,750.00	Yuma	Yuma	Public
Desert Botanical Gardens	Compost Project and Demonstration	WRA	1996	$18,659.00	Phoenix	Maricopa	Public
Lone Pine LGFC	Drop-off Center and Compartmentalized Containers	WRA	1996	$16,225.00	Pinetop-Lakeside	Navajo	Public
Northern Arizona University	NAU Residence hall Recycling System	WRA	1996	$31,084.00	Flagstaff	Coconino	University
Phoenix Clean and Beautiful	SHARES Program	WRA	1996	$6,700.00	Phoenix	Maricopa	Non-profit
Pinal County	Mobile Recycling Project	WRA	1996	$36,399.00	Florence	Pinal	Public
Sun City Lions Club	Sun City paper Mechanization	WRA	1996	$5,000.00	Sun City	Maricopa	Non-profit
Sun Lakes Homeowners Association	Recycling Expansion Project	WRA	1996	$27,516.00	Sun Lakes	Maricopa	Non-profit
Town of Jerome	Jerome Compost Bins	WRA	1996	$8,891.00	Jerome	Yavapai	Public
University of Arizona	machine to Separate Bindings and Covers	WRA	1996	$28,000.00	Tucson	Pima	University
Arkay Enterprises	Winner' s Circle Soils	SWRA	1997	$60,000.00	Taylor	Navajo	Private
City of Douglas	Recycling Upgrade and Expansion	SWRA	1997	$32,120.00	Douglas	Cochise	Public

Organization	Project	Grant	Year	Funding	City	County	Type
City of Yuma Parks and Recreation	Backyard Composting Program	SWRA	1997	$10,470.00	Yuma	Yuma	Public
Cottonwood - Verde Valley Recycles	Compost and Recycling Program	SWRA	1997	$10,000.00	Cottonwood	Yavapai	Non-profit
ECO, Inc.	Recycling Association of Maricopa (RAM)	SWRA	1997	$54,635.00	Maricopa	Pinal	Non-profit
Norton Environmental, Inc.	Flagstaff Glass Pulverizing System	SWRA	1997	$60,000.00	Flagstaff	Coconino	Private
Palo Verde Disposal Service	Southern La Paz County Cooperative Recycling	SWRA	1997	$48,855.00	Blythe	La Paz	Private
Sierra Huachuca ARC, Inc.	SHARC Recycling	SWRA	1997	$56,429.00	Sierra Vista	Cochise	Public
Agua-Fria - New River NRCD	The Earthworm Tunnel	WRITE	1998	$14,143.00	Phoenix	Maricopa	Public
Arizona Clean and Beautiful	Influence Behavior Public Service Announcements	WRITE	1998	$39,700.00	Phoenix	Maricopa	Non-profit
Arizona Clean and Beautiful	Recycling Education in Rural Arizona	WRITE	1998	$11,537.00	Phoenix	Maricopa	Non-profit
Arizona Hotel/Motel Association	Education Campaign for the Hospitality Industry	WRITE	1998	$19,300.00	Scottsdale	Maricopa	Private
AzRC, Organic Products Committee	Annual Compost Workshop	WRITE	1998	$7,000.00	Phoenix	Maricopa	Non-profit
City of Tucson, Solid Waste	Ravin' about Recycling!	WRITE	1998	$51,385.00	Tucson	Pima	Public
Cottonwood - Verde Valley Recycles	Education Outreach	WRITE	1998	$25,000.00	Cottonwood	Yavapai	Non-profit
Gila County Solid Waste Department	Gila County Recycle Grant	WRITE	1998	$3,340.50	Globe	Gila	Public
Southwest Public Recycling Association	Technical Assistance to Rural Arizona Communities	WRITE	1998	$28,018.00	Tucson	Pima	Non-profit
Town of Gilbert	Recycling Education Pilot Project	WRITE	1998	$2,202.00	Gilbert	Maricopa	Public
Tucson Clean and Beautiful	Waste Reduction Education Display and Brochures	WRITE	1998	$8,050.00	Tucson	Pima	Non-profit
VMB Enterprises	Grant Training Seminars	WRITE	1998	$12,810.00	Phoenix	Maricopa	Private
Arizona State University	Development of Crumb Rubber Composites	WRA	1998	$29,891.00	Tempe	Maricopa	University
City of Williams	Curbside Recycling	WRA	1998	$57,135.00	Williams	Coconino	Public
EnviroSand, Inc.	Enviro Mill Machine	WRA	1998	$75,000.00	Scottsdale	Maricopa	Private
The Farm at South Mountain	Compost Demonstration Site	WRA	1998	$15,000.00	Phoenix	Maricopa	Private
Friedman Recycling	Small Business Recycling	WRA	1998	$39,000.00	Phoenix	Maricopa	Private
Gila Ridge Pallet Company	Pallet Waste Reduction	WRA	1998	$52,200.00	Yuma	Yuma	Private

Organization	Project	Grant	Year	Funding	City	County	Type
Growers Market	Maximum Diversion of Green Waste	WRA	1998	$58,000.00	Phoenix	Maricopa	Private
Habitat for Humanity	Construction Closet	WRA	1998	$50,000.00	Tucson	Pima	Non-profit
Laidlaw Waste Systems	Boy Scout Newspaper Recycling	WRA	1998	$8,010.00	Lake Havasu City	Mohave	Private
Maricopa Association of Governments	Recycling Information Exchange	WRA	1998	$18,880.00	Phoenix	Maricopa	Public
Pinal County	Expanded Mobile Recycling	WRA	1998	$24,000.00	Florence	Pinal	Public
Santa Cruz County	ABOP Recycling Station	WRA	1998	$32,500.00	Nogales	Santa Cruz	Public
Terra-Cycle Technologies	Vegetable Waste Composting	WRA	1998	$65,000.00	Tumacoacori	Santa Cruz	Private
Tucson Iron and Metal	Paper and Plastic Recycling	WRA	1998	$75,000.00	South Tucson	Pima	Private
City of Flagstaff	Curbside Recycling	WRITE	1999	$32,922.00	Flagstaff	Coconino	Public
City of Phoenix	Toxic Avenger	WRITE	1999	$5,500.00	Phoenix	Maricopa	Public
Cochise County	Coordinated Recycling Education	WRITE	1999	$60,000.00	Bisbee	Cochise	Public
ECO 1	RAM Education Project	WRITE	1999	$19,989.00	Maricopa	Pinal	Non-profit
EM Technologies	EM Bukashi Composting	WRITE	1999	$57,292.00	Tucson	Pima	Private
Southwest Public Recycling Association	HHW Brochure	WRITE	1999	$14,000.00	Tucson	Pima	Non-profit
Southwest Public Recycling Association	Technical Assistance	WRITE	1999	$31,150.00	Tucson	Pima	Non-profit
Starr Communications	Radio Public Service Advertisements Campaign	WRITE	1999	$24,180.00	Cottonwood	Yavapai	Non-profit
Tuba City	Protective Circle	WRITE	1999	$13,690.00	Tuba City	Coconino	Public
City of Bisbee	Wood Chipping Program	WRA	1999	$12,468.00	Bisbee	Cochise	Public
Colorado River Indian Tribes	Purchase of a Mulching Machine	WRA	1999	$20,900.00	Parker	La Paz	Public
ELF Products, LLC	Shipping Pallets Using Recycled Plastics	WRA	1999	$75,000.00	Tucson	Pima	Private
Gila County Solid Waste Department	Purchase a Wood Chipper	WRA	1999	$33,703.00	Globe	Gila	Public
LB International, Inc.	Bio-Mass Fuel Source - “ Eco-Log”	WRA	1999	$75,000.00	Fredonia	Coconino	Private
Southwest Public Recycling Association	Commercial Glass Recycling Infrastructure	WRA	1999	$33,300.00	Phoenix	Maricopa	Non-profit
Tucson Roll-offs and Recycling	Construction and Demolition Debris Sorting Line	WRA	1999	$73,400.00	Tucson	Pima	Private

Organization	Project	Grant	Year	Funding	City	County	Type
Universal Entech, LLC	Construction and Demolition Debris Screening System	WRA	1999	$75,000.00	Phoenix	Maricopa	Private
Verde Valley Fire Chief' s Association	Verde Valley HHW Demonstration Program	WRA	1999	$25,000.00	Cottonwood	Yavapai	Public
Waste Not Recycling Centers	Nylon 6 and Nylon 6.6 Carpet Recycling	WRA	1999	$48,750.00	Phoenix	Maricopa	Private
Western Organics, Inc.	Screening for the Future	WRA	1999	$75,000.00	Tempe	Maricopa	Private
Arizona State University	Paint Materials that Contain Crumb Rubber	R & D	1999	$6,300.00	Tempe	Maricopa	University
Hortec, Inc.	Reuse of Dairy Waste Water in Composting	R & D	1999	$50,000.00	Phoenix	Maricopa	Private
Northern Arizona University	Composing of Food Service Waste	R & D	1999	$6,300.00	Flagstaff	Coconino	University
Sonora Environmental Research Institute	Recycled Mixed Cullet as an Alternative Abrasive	R & D	1999	$45,062.00	Tucson	Pima	Private
Sonora Environmental Research Institute	Develop a Low Cost Sorter of Recyclable Material	R & D	1999	$43,730.00	Tucson	Pima	Private
Southwest Public Recycling Association	Waste Characterization Studies for Rural Communities	R & D	1999	$35,238.00	Tucson	Pima	Non-profit

Appendix E

Public Recycling Program Coordinators List

The following is an alphabetical listing of Recycling Coordinators for the 102 local public jurisdictions in Arizona. This list contains contact names for county, city and town officials, and non-profit organizations and is used to obtain data on the recycling activities throughout Arizona. Revisions to this list are made on a continual basis. Please contact Jackie Hosier at 1-(800)-234-5677, ext. 4134, if you have any questions regarding this listing. The information is current as of **September 08, 1999.**

Apache County
Leon Slade — Manager
Apache County Regional Landfill/Blue Hills Environmental — Work phone: (520) 337-2357
PO Box 175 — Fax: (520) 337-2003
St. Johns, AZ 85936

Apache Junction
Doug Dobson — Director of Public Works
City of Apache Junction — Work phone: (480) 982-1055
1001 N. Idaho Road — Fax: (480) 983-5752
Apache Junction, AZ 85219

Avondale
Esmeralda Avila — Water Resource Technician
Public Works Department — Work phone: (623) 932-1909
City of Avondale — Fax: (623) 932-3329
1211 S. 4th Street
Avondale, AZ 85323

Benson
Mark Holt — City Manager
City of Benson — Work phone: (520) 586-2245
PO Box 2223 — Fax: (520) 586-3375
Benson, AZ 85602

Bisbee
Ray Sparkman — Public Works Director
City of Bisbee — Work phone: (520) 432-6000
118 Arizona Street — Fax: (520) 432-5858
Bisbee, AZ 85603

Buckeye
Delbert Self — Town Manager
Town of Buckeye — Work phone: (623) 386-4691
100 North Apache Road, suite A — Fax: (623) 386-7832
Buckeye, AZ 85326-9699

Bullhead City
Janice Paul
City of Bullhead City
1255 Marina Boulevard
Bullhead City, AZ 86442

Planning Official
Work phone: (520) 763-0123
Fax: (520) 763-2467

Camp Verde
Bruce Billstrand
Town of Camp Verde
PO Box 710
Camp Verde, AZ 86322

Zoning Inspector
Work phone: (520) 567-6631
Fax: (520) 567-9061

Carefree
Jonathan Pearson
Town of Carefree
PO Box 740
Carefree, AZ 85377

Town Administrator
Work phone: (480) 488-3686
Fax: (480) 488-3845

Casa Grande
Frank Tapia
City of Casa Grande
PO Box 15011
Casa Grande, AZ 85230-5011

Solid Waste Superintendent
Work phone: (520) 421-8725
Fax: (520) 421-8602

Cave Creek
Phil Hughes
Town of Cave Creek
37622 N. Cave Creek Road
Cave Creek, AZ 85331

Work phone: (480) 488-1400
Fax: (480) 488-2263

Chandler
Sheree Sepulveda
City of Chandler
Mail Stop 907
PO Box 4008
Chandler, AZ 85225-5550

Recycling Specialist
Work phone: (480) 786-2866
Fax: (480) 786-2582

Chino Valley
J. H. Mazy
Town of Chino Valley
PO Box 406
Chino Valley, AZ 86323

Work phone: (520) 636-2646
Fax: (520) 636-2144

Clarkdale
Karla Davis
Town of Clarkdale
PO Box 308
Clarkdale, AZ 86324

Deputy Town Clerk
Work phone: (520) 634-9591
Fax: (520) 634-0407

Clifton
Nazario Hernandez
Town of Clifton
PO Box 1415
Clifton, AZ 85533

Public Works Director
Work phone: (520) 865-4146
Fax: (520) 865-4472

Cochise County
Sam Warne
Facilities and Solid Waste Management
Cochise County
1415 W. Melody Lane, building C
Bisbee, AZ 85603

Solid Waste Supervisor
Work phone: (520) 432-9482
Fax: (520) 432-9423

Coconino County
Vickie Amabisca
Highway Department
Coconino County
5600 E. Commerce
Flagstaff, AZ 86004

Administrative Assistant
Work phone: (520) 526-2735
Fax: (520) 526-8221

Colorado City
Dean Cooke
Town of Colorado City
PO Box 70
Colorado City, AZ 86021

Public Works Director
Work phone: (520) 875-2722
Fax: (520) 875-2778

Coolidge
Donald Peters
Public Works Department
City of Coolidge
PO Box 1498
Coolidge, AZ 85228

Director of Public Works
Work phone: (520) 723-4882
Fax: (520) 723-7910

Cottonwood
Marilyn Spaeth
City of Cottonwood
827 N. Main Street
Cottonwood, AZ 86326

Recycling Coordinator
Work phone: (520) 634-8033
Fax: (520) 634-7285

Douglas
Wendell Lewis
Office of Public Works
City of Douglas
425 10th Street
Douglas, AZ 85607

Recycler/Code Enforcement
Work phone: (520) 805-4077
Fax: (520) 364-7507

Duncan
Lupe Madrigal
Town of Duncan

Public Works Director
Work phone: (520) 359-2791

PO Box 916
Duncan, AZ 85534

Fax: (520) 359-9146

Eagar
Kay Dyson
Town of Eagar
PO Box 1300
Eagar, AZ 85925

Public Works Director
Work phone: (520) 333-4223
Fax: (520) 333-5140

El Mirage
Leonard Rivera
City of El Mirage
PO Box 26
El Mirage, AZ 85335

Assistant City Manager
Work phone: (623) 972-8116
Fax: (623) 972-8110

Eloy
Fred Rustam
City of Eloy
628 North Main Street
Eloy, AZ 85231

Work phone: (520) 466-3082
Fax: (520) 466-3161

Flagstaff
Rebekah Cadigan
City of Flagstaff
211 W. Aspen Drive
Flagstaff, AZ 86001

Recycling Coordinator
Work phone: (520) 779-7621
Fax: (520) 779-7696

Florence
Jerry Allen
Town of Florence
PO Box 490
Florence, AZ 85232-0490

Water/Wastewater Superintendent
Work phone: (520) 868-5134
Fax: (520) 868-9628

Fountain Hills
Robin Goodwin
Parks and Recreation Department
Town of Fountain Hills
PO Box 17958
Fountain Hills, AZ 85269-7958

Director
Work phone: (480) 816-5117
Fax: (480) 837-3145

Fredonia
Barbara Kimball
Town of Fredonia
PO Box 217
Fredonia, AZ 86022

Town Clerk
Work phone: (520) 643-7241
Fax: (520) 643-7627

Gila Bend
Gene Merritt
Town of Gila Bend
PO Box A
Gila Bend, AZ 85337

Public Works Director
Work phone: (520) 256-6509
Fax: (520) 256-7856

Gila County
Sharon Radanovich
Gila County
1400 East Ash Street
Globe, AZ 85501

Fiscal Coordinator
Work phone: (520) 425-3231 315
Fax: (520) 425-8104

Gilbert
Beth Jackson
Town of Gilbert
525 N. Lindsay Road
Gilbert, AZ 85234

Refuse Inspector
Work phone: (480) 503-6437
Fax: (480) 503-6404

Glendale
Ernie Ruiz
City of Glendale
6210 W. Myrtle Avenue, suite 111
Glendale, AZ 85301

Solid Waste Management
Work phone: (623) 930-2681
Fax: (623) 915-3124

Globe
Larry Hensen
City of Globe
150 N. Pine Street
Globe, AZ 85501

City Engineer
Work phone: (520) 425-8346
Fax: (520) 425-4820

Goodyear
Steve Ruppenthal
City of Goodyear
200 South Calle del Pueblo
Goodyear, AZ 85338

Utilities Supervisor
Work phone: (623) 932-1637
Fax: (623) 932-3020

Graham County
Neil Karnes
Graham County
826 W. Main Street
Safford, AZ 85546

Health Department Director
Work phone: (520) 428-1962
Fax: (520) 428-5951

Greenlee County
Phillip A. Ronnerud
Greenlee County
PO Box 908
Clifton, AZ 85533

Engineer
Work phone: (520) 865-4762
Fax: (520) 865-4417

Guadalupe
Mark Johnson
Town of Guadalupe
9050 S. Avenida del Yaqui
Guadalupe, AZ 85283

Finance Director
Work phone: (480) 730-3080
Fax: (480) 730-3097

Hayden
Robert Lorona
Town of Hayden
PO Box B
Hayden, AZ 85235

General Superintendent
Work phone: (520) 356-7801
Fax: (520) 356-6334

Holbrook
Joe Rye
City of Holbrook
465 First Avenue
Holbrook, AZ 86025

Community Development Director
Work phone: (520) 524-1682
Fax: (520) 524-2159

Huachuca City
Vivian Cobb
Town of Huachuca City
500 N. Gonzales Boulevard
Huachuca City, AZ 85616

Floor Supervisor
Work phone: (520) 456-9889
Fax: (520) 456-9868

Jerome
Ron Ballatore
Town of Jerome
PO Box 335
Jerome, AZ 86331

Public Works Director
Work phone: (520) 634-7943
Fax: (520) 634-0715

Kearny
Margaret Gaston
Town of Kearny
PO Box 639
Kearny, AZ 85237

Town Clerk
Work phone: (520) 363-5547
Fax: (520) 363-7527

Kingman
Robert Vernetti
Public Works
City of Kingman
3700 E. Andy DeVine
Kingman, AZ 86401

Sanitation Superintendent
Work phone: (520) 692-3102
Fax: (520) 757-8340

Lake Havasu City
Brian Conway
River City Waste
2000 West Acoma Boulevard
Lake Havasu City, AZ 86403

Market General Manager
Work phone: (520) 855-9441
Fax: (520) 855-5369

La Paz County
Mary Dahl
La Paz County
1112 Joshua, ste. 202
Parker, AZ 85344

Director of Community Development
Work phone: (520) 669-6138
Fax: (520) 669-5503

Litchfield Park
Robert Gaunt
City of Litchfield Park
214 West Wigwam Boulevard
Litchfield Park, AZ 85340

Director of Public Works
Work phone: (623) 935-5033
Fax: (623) 935-5427

Mammoth
Randy Scott
Town of Mammoth
PO Box 30
Mammoth, AZ 85618

Work Phone: (520) 487-2331
Fax: (520) 487-2152

Marana
Pauline Nunez
Department of Public Works
Town of Marana
13555 N. Sanders Road
Marana, AZ 85653

Work phone: (520) 682-3324
Fax: (520) 682-3749

Maricopa County
Ash Maddock
Solid Waste Management
Maricopa County
2801 West Durango
Phoenix, AZ 85009

Director of Solid Waste
Work phone: (602) 506-8726
Fax: (602) 506-8396

Mesa
Jennifer Means
Department of Solid Waste
City of Mesa
PO Box 1466
Mesa, AZ 85211-1466

Recycling Specialist
Work phone: (480) 644-3673
Fax: (480) 644-3057

Miami
John Encizo
Town of Miami
500 Sullivan Street
Miami, AZ 85539

Public Works Director
Work phone: (520) 473-4403
Fax: (520) 473-3003

Mohave County
Jerry Hill
Mohave County
PO Box 7000
Kingman, AZ 86402-7000

Coordinator Emergency Management
Work phone: (520) 757-0910
Fax: (520) 757-0912

Navajo County
Dave Ashton
Public Works Department
Navajo County
PO Box 668
Holbrook, AZ 86025

Assistant County Engineer
Work phone: (520) 524-4100
Fax: (520) 524-4122

Nogales
Michele Kimpel
City of Nogales
777 North Grand Avenue
Nogales, AZ 85621

Environmental Engineer
Work phone: (520) 287-6571
Fax: (520) 287-9159

Oro Valley
Ainsley Anne Reeder
Town of Oro Valley
680 West Calle Concordia
Oro Valley, AZ 85737

Parks and Recreation Administrator
Work phone: (520) 797-9096
Fax: (520) 297-2202

Page
Mary Scheel
Page Recycles
PO Box 488
Page, AZ 86040

Coordinator
Work phone: (520) 645-9378
Fax: (520) 645-1261

Paradise Valley
Glen Cornwell
Town of Paradise Valley
6401 E. Lincoln
Paradise Valley, AZ 85253-4399

Work phone: (480) 948-7411
Fax: (480) 951-3715

Parker
Frank Savino, Jr.
Town of Parker
PO Box 609
Parker, AZ 85344

Public Works Director
Work phone: (520) 669-9265
Fax: (520) 669-5247

Patagonia
Willie Sanchez
Town of Patagonia
PO Box 767
Patagonia, AZ 85624

Work phone: (520) 394-2229
Fax: (520) 394-2861

Payson
Colin "Buzz" Walker
Town of Payson
303 A North Beeline Highway
Payson, AZ 85541

Public Works Director
Work phone: (520) 474-5242 285
Fax: (520) 474-7052

Peoria
Larry Fudurich
Public Services Department - Municipal Operations Center
City of Peoria
8850 N. 79th Avenue
Peoria, AZ 85345

Public Works Superintendent
Work phone: (623) 412-7456
Fax: (623) 412-7457

Phoenix
Terry Gellenbeck
Public Works Department - Recycling Section
City of Phoenix
101 S. Central Avenue, suite 500
Phoenix, AZ 85004

Solid Waste Administrative Analyst
Work phone: (602) 256-5607
Fax: (602) 534-9864

Pima
John Bryce
Town of Pima
PO Box 426
Pima, AZ 85543

Town Clerk/Manager
Work phone: (520) 485-2611
Fax: (520) 485-9230

Pima County
Suzanne Shields
Pima County
130 W. Congress Street
Tucson, AZ 85701-1317

Wastewater Management
Work phone: (520) 744-7649
Fax: (520) 628-7963

Pinal County
Barbara Parkin-McBride
Department of Solid Waste
Pinal County
PO Box 1747
Florence, AZ 85232

Program Coordinator - Recycling
Work phone: (520) 868-6685
Fax: (520) 868-6512

Pinetop-Lakeside
Eldon Skousen
Town of Pinetop-Lakeside
1360 N. Niels Hansen Lane
Lakeside, AZ 85929

Recycling Coordinator
Work phone: (520) 368-8696
Fax: (520) 368-8528

Prescott
Rob Waskow
City of Prescott
PO Box 2059
Prescott, AZ 86302

Solid Waste Superintendent
Work phone: (520) 771-5849
Fax: (520) 771-5824

Prescott Valley
Larry Tarkowski
Town of Prescott Valley
PO Box 25456
Prescott Valley, AZ 86312

Public Works Director
Work phone: (520) 775-4022
Fax: (520) 775-3034

Quartzite
Glen Hill
Town of Quartzite
PO Box 2812
Quartzite, AZ 85346

Work phone: (520) 927-4333
Fax: (520) 927-4400

Queen Creek
Joseph La Fortune
Town of Queen Creek
22350 S. Ellsworth Road
Queen Creek, AZ 85242

Management Assistant
Work phone: (480) 987-9887
Fax: (480) 987-0109

Safford
Robert Porter
City of Safford
PO Box 272
Safford, AZ 85548-0272

Public Works Director
Work phone: (520) 348-3192
Fax: (520) 348-3150

Sahuarita
Greg Saxe
Town of Sahuarita
PO Box 879
Sahuarita, AZ 85629

Planning Director
Work phone: (520) 648-1972
Fax: (520) 625-9879

San Luis
David M. Ford
City of San Luis
PO Box 3750
San Luis, AZ 85369

Public Works Director
Work phone: (520) 627-8848
Fax: (520) 627-2265

Santa Cruz County
Norma Northcross
Santa Cruz County Public Works Department
Santa Cruz County Complex
2150 N. Congress Drive, room 117
Nogales, AZ 85621

Public Works Technician
Work phone: (520) 761-7800 3072
Fax: (520) 761-7843

Scottsdale
Shawn McCready
Coordinator
City of Scottsdale
Solid Waste Management Division
9191 East San Salvador Drive
Scottsdale, AZ 85258

Solid Waste Management Services

Work phone: (480) 391-5600
Fax: (480) 391-5539

Sedona
Kate Blevins
Sedona Recycles, Inc.
2280 Shelby Drive
Sedona, AZ 86336

Director
Work phone: (520) 204-1185
Fax: (520) 204-9089

Show Low
Rob Emmett
City of Show Low
200 W. Cooley
Show Low, AZ 85901

Public Works Director
Work phone: (520) 537-5724
Fax: (520) 537-2338

Sierra Vista
Brian Bauer
City of Sierra Vista
1101 N. Coronado Drive
Sierra Vista, AZ 85635

Management Analyst
Work phone: (520) 458-3315
Fax: (520) 452-7099

Snowflake
Gary Leach
Town of Snowflake
81 W. 1st Street
Snowflake, AZ 85937

Solid Waste Supervisor
Work phone: (520) 536-7103 257
Fax: (520) 536-2539

Somerton
Edmundo Mendez
City of Somerton
PO Box 638
Somerton, AZ 85350

Director of Public Works
Work phone: (520) 627-4155
Fax: (520) 627-3794

South Tucson
Angel Lopez
City of South Tucson
1601 South 5th Street
South Tucson, AZ 85713

Solid Waste Supervisor
Work phone: (520) 770-0031
Fax: (520) 628-9619

Springerville
Ernest Anaya
Town of Springerville
PO Box 390
Springerville, AZ 85938

Public Works Director
Work phone: (520) 333-5016
Fax: (520) 333-3268

St. Johns
Bill Prentice
City of St. Johns
PO Box 96
St. Johns, AZ 85936

Public Works Director
Work phone: (520) 337-2031
Fax: (520) 337-3325

Superior
Gail Jimenez
Town of Superior
734 Main Street
Superior, AZ 85273

Administrative Clerk
Work phone: (520) 689-5752
Fax: (520) 689-5822

Surprise
Robert Zobel
City of Surprise
12425 West Bell Road, suite D100
Surprise, AZ 85374

Public Works Director
Work phone: (623) 583-0947
Fax: (623) 583-0721

Taylor
Leon Palmer
Town of Taylor
PO Box 158
Taylor, AZ 85939

Town Manager
Work phone: (520) 536-7366
Fax: (520) 536-7027

Tempe
Gaylan Oliphant
Field Services Division
City of Tempe
PO Box 5002
Tempe, AZ 85280

Sanitation Inspector
Work phone: (480) 350-8146
Fax: (480) 350-8166

Thatcher
Bill Harmon
Town of Thatcher
PO Box 670
Thatcher, AZ 85552

Town Engineer
Work phone: (520) 428-2290
Fax: (520) 428-7061

Tolleson
Ray Dubois
City of Tolleson
9555 W. Van Buren Street
Tolleson, AZ 85353

Streets and Sanitation Supervisor
Work Phone: (623) 936-7141
Fax: (623) 907-0902

Tombstone
Kathy Miller
City of Tombstone
315 East Fremont Street
Tombstone, AZ 85638

City Clerk
Work phone: (520) 457-2202
Fax: (520) 457-3516

Tucson
Donald Gibson
Solid Waste Management Department
City of Tucson
PO Box 27210
Tucson, AZ 85726-7210

Recycling Coordinator
Work phone: (520) 791-4745
Fax: (520) 791-4155

Wellton
Gary Rinehart
Town of Wellton
PO Box 67
Wellton, AZ 85356

Deputy Town Clerk
Work phone: (520) 785-3348
Fax: (520) 785-4065

Wickenburg
Russell Willis
Town of Wickenburg
155 North Tegner, Suite A
Wickenburg, AZ 85390

Assistant Public Works Director
Work phone: (520) 684-2761
Fax: (602) 506-1580

Willcox
Jesus Esqueda
City of Willcox
151 W. Manley Street
Willcox, AZ 85643

Streets/Solid Waste Foreman
Work phone: (520) 384-4271
Fax: (520) 384-2587

Williams
Douglas Owens
City of Williams
113 S. 1st Street
Williams, AZ 86046

Sanitation Supervisor
Work phone: (520) 635-4451
Fax: (520) 635-4495

Winkelman
Estanislado Bravo
Town of Winkelman
PO Box 386
Winkelman, AZ 85292

Public Works Supervisor
Work phone: (520) 356-7854
Fax: (520) 356-7709

Winslow
Roger K. Kuster
City of Winslow
21 Williamson Avenue
Winslow, AZ 86047

Utility Manager
Work phone: (520) 289-4011
Fax: (520) 289-3742

Yavapai County
Brooke Sines
Department of Solid Waste
Yavapai County
1100 Commerce Drive
Prescott, AZ 86301

Account Clerk
Work phone: (520) 771-3189
Fax: (520) 771-3431

Youngtown
Jesse Mendez
Town of Youngtown
12030 Clubhouse Square
Youngtown, AZ 85363

Director of Public Works
Work phone: (602) 933-8286
Fax: (602) 933-5951

Yuma
Larry Knight
City of Yuma
155 W. 14th Street
Yuma, AZ 85364-4711

Solid Waste
Work phone: (520) 343-8889
Fax: (520) 343-8852

Yuma County
William Beck
Yuma County Public Works
2703 Avenue B
Yuma, AZ 85364

Solid Waste/Technical Support Manager
Work phone: (520) 329-2306
Fax: (520) 317-5180